Electrolux
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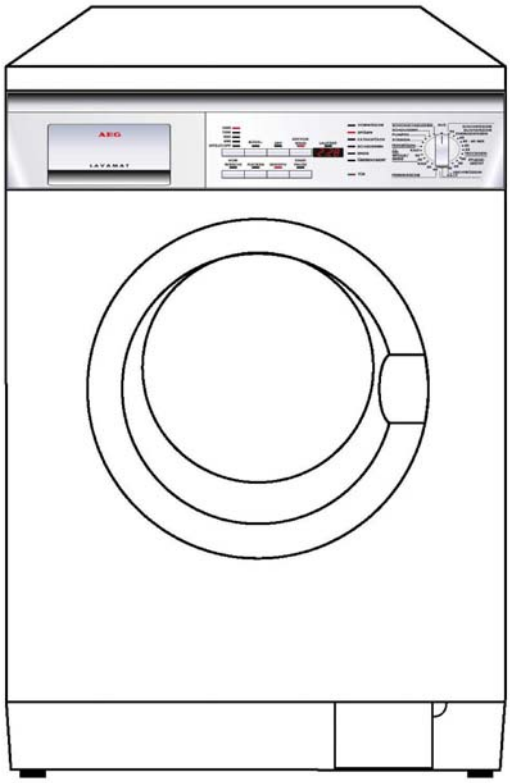
SERVICE MANUAL

WASHING



Washing machines with EWM 1000 PLUS electronic control system and "AEG Nexxxt" display board

With sensor

Production ZP (Porcia-Italy)

© ELECTROLUX HOME PRODUCTS ITALY S.p.A.
Spares Operations Italy
Corso Lino Zanussi, 30
I - 33080 PORCIA /PN

Fax +39 0434 394096

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1 Purpose of this manual

The purpose of this manual is to provide service engineers who are already familiar with the repair procedures for traditional washing machines with information regarding appliances fitted with the EWM 1000 plus electronic control system and produced in Porcia (Italy).
The electronic control system plus EWM1000 plus consists of a main electronic board and one control/display board, “Aeg Nexxxt” version.
The following are described:

- General characteristics
- Control panel and washing programmes
- Technical characteristics
- Guide to the diagnostics

For detailed information concerning hydraulic circuit, structural characteristics of the appliances and accessibility, please refer to Service Manual of washing machines and washer-dryers Series P6000/Nexus (publication no. 599 35 23-17).

2 PRECAUTIONS

- **Electrical appliances must be serviced only by qualified Service Engineers.**
- **Always remove the plug from the power socket before touching internal components.**

3 GENERAL CHARACTERISTICS

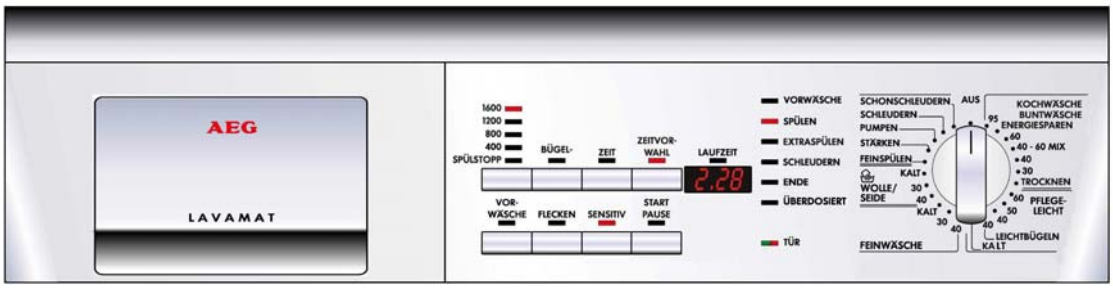
Programme selector	▪ 24-position with incorporated general switch
Serial port	▪ DAAS-EAP communications protocol up to 38400 baud
Power supply	▪ 220/240V ▪ 50/60 Hz (configurable)
Type of washing	▪ Traditional ▪ with “eco-ball” sphere
Rinsing system	▪ Traditional
Motor	▪ Collector, with tachometric generator
Spin speed	▪ 850 ÷ 1600 rpm
Anti-unbalancing system	▪ FUCS
Water fill	▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
Detergent drawer	▪ 3 compartments: prewash/stains, wash, conditioners ▪ 4 compartments: prewash/stains, wash, conditioners, bleach
Control of water level in the tub	▪ two-level pressure switch: 1st level and anti-boiling safety level (the other levels refer to fixed-time fills) ▪ possibility of three-level pressure switch: 1st level, anti-boiling and anti-flooding safety levels
Door safety device	▪ Traditional (with PTC) ▪ Instantaneous
Power of heating element	▪ Up to 1950W
Temperature control	▪ NTC sensor
Sensors	▪ Water Control

4 CONTROL PANEL

The configuration of the control panel depends on the following:

- Type of control/display board
- Programme selector
- Design of the control panel (no. of buttons, LEDs)
- Different configuration of the buttons

Example of control panel:



Buttons:

- max. 8, horizontally

LEDs:

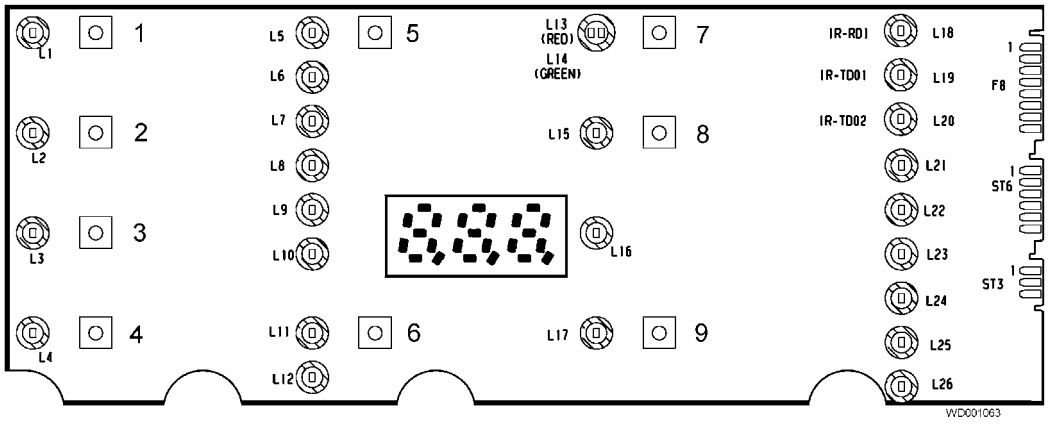
- max. 26

Display:

- 3 digits with 24 red LEDs

4.1 Control/display board

4.1.1 Version with display:

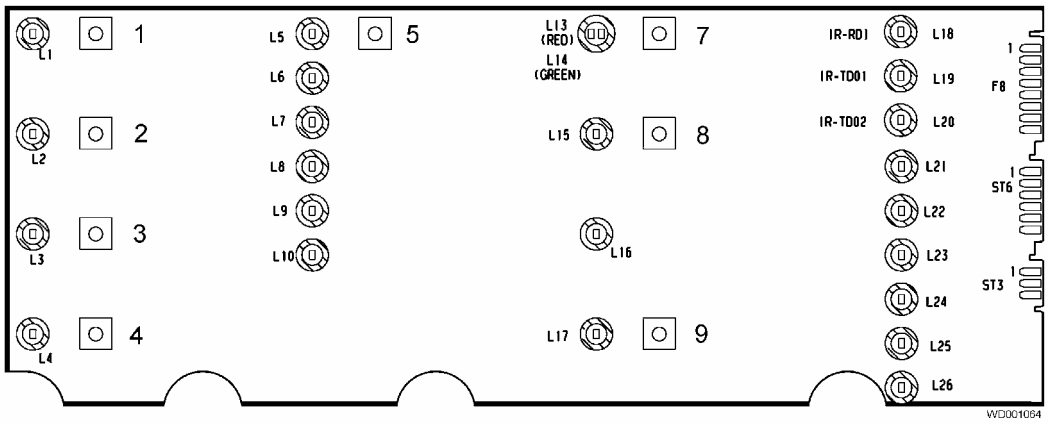


⇨ 3 digits

⇨ 27 LEDs: 26 red, one bicolour (red and green)

⇨ 9 buttons

Version without display:



⇨ 26 LEDs: 25 red, one bicolour (red and green)

⇨ 8 buttons

4.2 Washing programmes

4.2.1 Configuration of the programmes

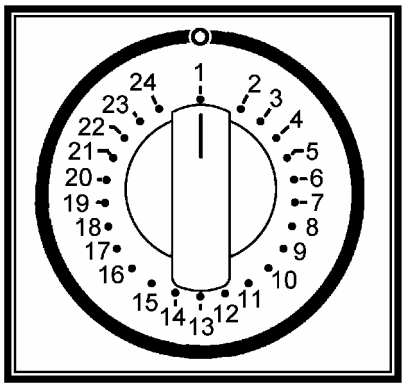
The table below lists the parameters that can be used to define the washing programmes.

Types of fabrics	Cotton/linen, Synthetics, Delicates, Wool, Hand-wash
Special programmes	Soak, Rinses, Spin, Drain, Conditioner
Temperature	Normal, Maximum: the initial temperature is the maximum that can be selected for a specific washing programme
Spin	Normal, Minimum, Maximum
Options (Normal/Possible)	Bleach, Economy (energy label), Stains, Short, Very short, Reduced spin speed, Night-time cycle, Half-load, Easy-Iron, Rinse Hold, Extra rinse, Pre-wash, Soak and Sensitive
Programme phases	Pre-wash, Wash, Rinses, Spin, Economy, Delayed start

4.3 Programme selector

The programme selector defines the type of washing cycle (ex: water level, drum movement, no of rinses) and washing temperature to be selected according to the type of wash.
The programme selector can be rotated both clockwise and anti-clockwise.

The first position is used to cancel the current programme and to switch the appliance off, if the main switch is incorporated in the selector.



4.4 Start/Pause

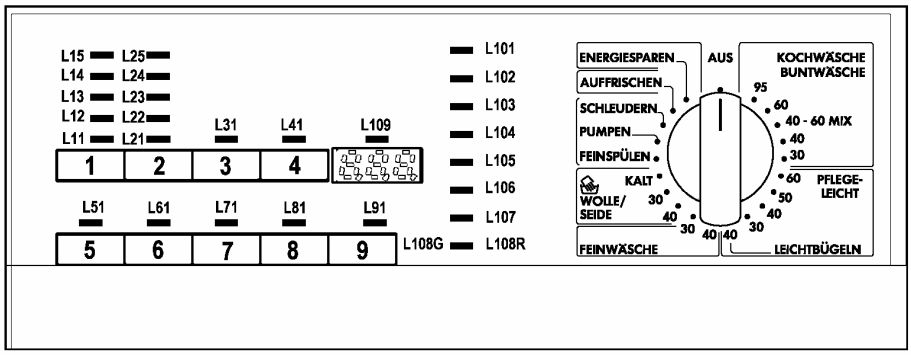
Start: after selecting the programme and the desired options, press this button to start. If the delay time ahs been selected, the countdown will begin and the display will indicate it. The LED stops flashing and remains lit for the whole duration of the programme.

Pause: by pressing the button again, the current programme is interrupted and the display or the corresponding LED starts flashing. During the pause phase it is possible to open the door only if the machine is not during the heating phase, the water level is not high and the drum is not moving.

During the pause it is possible to modify the programme as follows:
- the OPTIONS of the cycle can be modified before the phase by which they have to be performed
- the SPIN can be modified before the final spin

To re-start the programme press the START/PAUSE button again.

4.5 Functions of the buttons



The washing programmes and the functions of the single buttons vary for the different models, since they are determined by the configuration operation of the appliance.

5 WASHING PROGRAMMES AND OPTIONS

5.1 Programmes

The washing programmes can be configured. The basic programmes are listed in the table below.

Programme		Temperature (°C)	Number of rinses	Final spin (rpm)
Cotton	**90**	87	3	450/650/850/1000/1200/ 1300/1400/1600
	90E	67		
	60	60		
	60E	50 (*)(**)		
	50	50		
	50/40E	44 (*)		
	40	40		
	30	30		
	cold	20		
Synthetic fabrics	**60**	60	3	Max. 900
	60/50E	42 (*)		
	50	50		
	40	40		
	30	30		
	cold	20		
Delicates	**40**	40	3	450/700
	30	30		
	cold	20		
Wool	**40**	40	3	Max. 1000
	30	35		
	cold	20		
Hand-wash	**40**	40	3	Max. 1000
	30	35		
	cold	20		
Soak		30/20	----	----
Rinses		----	3	Max. 1600
Delicate rinses		----	3	Max. 700
Conditioner		----	1	Max. 1600
Drain		----	----	----
Spin		----	----	Max. 1600
Delicate spin		----	----	Max. 700
Mini		30	2	Max. 1000

(*) “Energy label” programmes

(**)

Programme	Group	Temperature (°C)
COTTON 60 E	G18	50
	G19	53
	G20	45
	G22	47

5.2 Options of the washing cycle

The selection of the options is to be carried out after switching on the appliance and setting the desired programme with the selector and before pressing the start/pause button.
When the button is pressed, the corresponding LED lights; by pressing it again the LED switches off.

Possible options according the selected programme

			OPTIONS														
			Rinse-hold	Night cycle	Pre-wash	Soak	Stains	Daily	Short	Economy	Sensitive	Extra rinse	Bleach	Half-load	Easy iron	Reduced spin speed	No spin
Compatibility with PROGRAMMES	COTTON	90°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		60°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		50°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		40°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		30°C	X	X	X	X		X	X		X	X	X	X	X	X	X
		Cold	X	X	X	X		X	X		X	X	X	X	X	X	X
	SYNTHETIC FABRICS	60°C	X	X	X	X	X	X	X	X	X	X			X	X	X
		50°C	X	X	X	X	X	X	X	X	X	X			X	X	X
		40°C	X	X	X	X	X	X	X		X	X			X	X	X
		30°C	X	X	X	X		X	X		X	X			X	X	X
		Cold	X	X	X	X		X	X		X	X			X	X	X
	MINI PROGRAMME	30°C	X	X												X	X
		Cold	X	X												X	X
	DELICATES	40°C	X	X	X	X			X			X				X	X
		30°C	X	X	X	X			X			X				X	X
		Cold	X	X	X	X			X			X				X	X
	WOOL – HAND-WASH	40°C	X	X												X	X
		30°C	X	X												X	X
		Cold	X	X												X	X
	SOAK																
	RINSES		X	X							X	X	X		X	X	X
	CONDITIONER		X	X											X	X	X
	DRAIN																
	SPIN															X	
Compatibility with OPTIONS	RINSE HOLD		■		X	X	X	X	X	X	X	X	X	X	X	X	X
	NIGHT CYCLE			■	X	X	X	X	X	X	X	X	X	X	X		
	PRE-WASH		X	X	■			X	X	X	X	X		X	X	X	X
	SOAK		X	X		■		X	X	X	X	X		X	X	X	X
	STAINS		X	X			■	X	X	X	X	X		X	X	X	X
	DAILY		X	X	X	X	X	■			X	X	X	X	X	X	X
	SHORT		X	X	X	X	X		■		X	X	X	X	X	X	X
	ECONOMY		X	X	X	X	X			■	X	X	X	X	X	X	X
	SENSITIVE		X	X	X	X	X	X	X	X	■	X	X	X		X	X
	EXTRA RINSE		X	X	X	X	X	X	X	X	X	■	X	X	X	X	X
	BLEACH		X	X				X	X	X	X	X	■	X	X	X	X
	HALF LOAD		X	X	X	X	X	X	X	X	X	X	X	■	X	X	X
	EASY IRON		X	X	X	X	X	X	X	X		X	X	X	■	X	X
	REDUCED SPIN SPPED		X		X	X	X	X	X	X	X	X	X	X	X	■	
	NO SPIN		X		X	X	X	X	X	X	X	X	X	X	X		■
Phases in which selection is possible	PRE-SELECTION		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	PRE-WASH		X	X			X	X	X	X	X	X	X	X	X	X	X
	WASH		X	X			X	X	X	X	X	X	X	X	X	X	X
	RINSES		X													X	X
	SPIN															X	X

5.3 Description of options

5.3.1 Night cycle

- Eliminates all spin phases and adds **three** rinses in COTTON cycles and **two** rinses in SYNTHETICS cycles.
- Stops the appliance with water in the tub before the final rinse.
- Switches off the buzzer (if configured)
- To drain the water select a drain or spin cycle.

5.3.2 Rinse-hold

- Stops the appliance with water in the tub before the final spin cycle.
- Switches off the buzzer (if configured)
- To drain the water select a drain or spin cycle.

5.3.3 Pre-wash

- Adds a pre-wash phase at the start of the cycle with water heating to 30°C (or cold, if selected).
- In COTTON and SYNTHETICS cycles, performs a short spin before passing to the washing phase.
- This option cannot be selected for WOOL and HAND-WASH cycles.

5.3.4 Soak

- Adds a pre-wash phase (30' duration with wool cycle movement) at the start of the cycle with water heating at 30°C (or cold, if selected).
- In COTTON and SYNTHETICS cycles, performs a short spin (impulse) before passing to the washing phase.
- Together with the delayed start option it is possible to select a soak time from 30 minutes up to 10 hours.
- This option cannot be selected for WOOL and HAND-WASH cycles.

5.3.5 Stains

- Adds a 5-minute motor movement phase after heating to 40°C.
- Ducts water to the pre-wash/stains compartment in order to introduce the special stain-removal product.
- This option cannot be selected for DELICATES, WOOL and HAND-WASH cycles.
- The movements during the washing phase change from vigorous to normal.

5.3.6 Short (daily)

- Modifies the structure of the washes in the COTTON and SYNTHETICS programmes in order to obtain good washing performance with a very short cycle (optimization for small loads).

5.3.7 Very short

- Modifies the structure of the COTTON, SYNTHETICS and DELICATES programmes in order to obtain short washing times (optimization for small or lightly-soiled loads).
- Reduces the number of rinse cycles (one less).
- Increases the water level in the remaining two rinse cycles.

5.3.8 Economy / Energy label

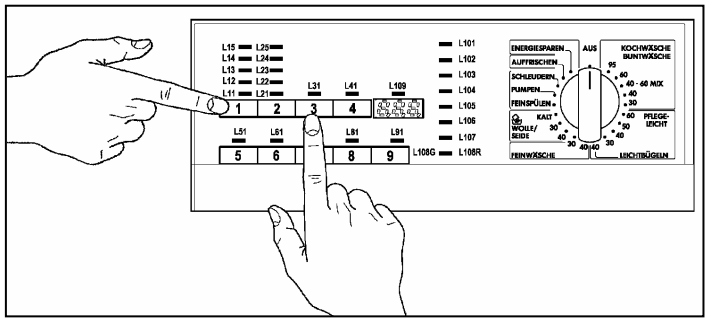
- Modifies the structure of the COTTON 40°/50°/60°/90° - SYNTHETIC FABRICS 50°/60° programmes in order to reduce energy consumption.
- Reduces the washing temperature in 90°/60°/50° programmes, while for the 40° programme the temperature is increased by 4°.
- Increases the duration of the wash phase.

5.3.9 Sensitive

- Adds a rinse in the COTTON – SYNTHETIC FABRICS.
- During the cotton cycles the movements pass from vigorous to normal.
- Eliminates the intermediate spins except from the last two which are reduced.

5.3.10 Extra rinse

Adds two rinses in the COTTON, SYNTHETICS and DELICATES cycles.
Eliminates the intermediate spin cycles, with the exception of the last rinse, which is reduced to 450 rpm.
If the appliance features this button press it and then the corresponding LED lights.
If the appliance does not feature it, proceed as follows:



To activate it, after selecting a COTTON or SYNTHETICS or DELICATES cycle, press the buttons (no. **1**) and button no. **3** simultaneously for at least 2 seconds, till the corresponding phase LED switches on.
This option remains <u>always active</u>, also in the following cycles; to deactivate it, repeat the same procedure: press button (no. 1) and button no. 3 simultaneously for at least 2 seconds, till the extra rinse LED switches off.

5.3.11 Bleach

- Ducts water through the bleach compartment at the beginning of the first rinse in COTTON cycles.
- Pre-wash possible only where there are three solenoids.
- In models with two solenoids the bleach is not compatible with the pre-wash option.

5.3.12 “Half load” button

- Eliminates a rinse in the COTTON programmes.

5.3.13 Easy-Iron

- **In COTTON programmes:**
- Adds three rinses.
- Eliminates the intermediate spins.
- Performs an impulse spin phase.
- Adds an “untangling” phase after the spin cycle.
- **In SYNTHETICS cycles:**
- Reduces the heating temperature in 50/60° cycles to 40°C.
- Increases the washing time.
- Prolongs the cooling phase at the end of the washing phase.
- Adds one rinse without spin cycle.
- Adds an “untangling” phase after the impulse spin cycle.

5.3.14 Reduced spin speed

- Reduces the speed of **all** spins as shown in the table.

Maximum spin speed (rpm)	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
Reduction for COTTON (rpm)	450	450	450	450	500	550	600	650	700	750	800
Reduction for ALL OTHER CYCLES (rpm)	450	450	450	450	450	450	450	450	450	450	450

5.3.15 No spin

- Eliminates **all** the spin phases.
- If selected, three rinses are added in the COTTON cycle and one in the SYNTHETICS cycle.

5.3.16 Modifying the spin speed

- Reduces the speed of **all** spin cycles.
- The last position can be used for NO SPIN, RINSE-HOLD.
- If the NO-SPIN option is selected, three rinses are added in the COTTON cycle, and one in the SYNTHETICS cycle.

5.3.17 Time reduction (Quick)

- Modifies the structure of the COTTON - SYNTHETICS– DELICATES programmes to obtain washing time very short (optimization for small or lightly-soiled loads).
- Reduces the no. of rinses (one rinse less).
- Increases the water level of the other two rinses.
- Corresponds to the SHORT- VERY SHORT cycles on the basis of the configuration of the appliance.

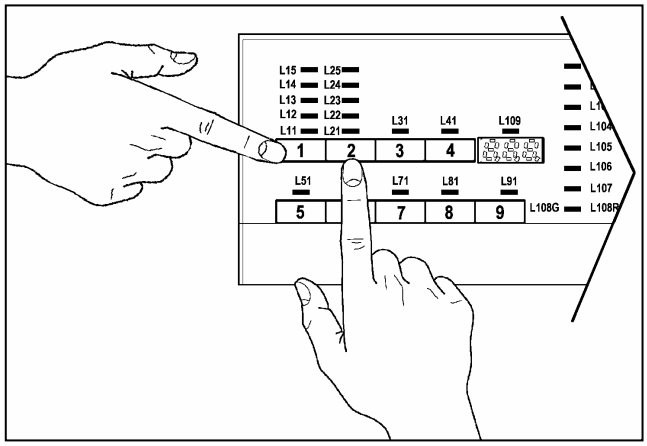
5.3.18 Temperature adjustment

- Used to select the washing temperature compatibly with the limit temperature for the cycle.
- Can be used during the cycle selection phase: the temperature can be modified only if the heating phase has not started (in pause mode).

5.3.19 "Exclusion of the buzzer"

In models with the buzzer it is possible to exclude the acoustic signal during the selection or at the end of the cycle, but the alarm remains on.

- Press buttons no. **1** and no. **4** (or no. 5) simultaneously to deactivate the buzzer for 2 seconds; this option will be memorised until it will be deactivated with the same procedure.



5.3.20 Delayed-start time

- **Models with digit**
- It is possible to select, during the programme selection phase, a delayed start from 30 minutes up to 23 hours (☞ 30'☞ 60'☞ 90'☞ 2h☞ 3h...☞ 23h☞ 0h).
- During the delay phase, the time decreases every hour up to 2h, then by 30minutes.
- To start the cycle immediately, after the delay time began: press the Start/Pause button, cancel the delay time by pressing the relative button and press Start/Pause again.

- **Models with led**
- Insert a pause before the start of the programme, the delay time is indicated by the corresponding LEDs.
- To start the cycle immediately, after the delay time began: press the Start/Pause button, cancel the delay time by pressing the relative button and press Start/Pause again.

5.4 Variation of the rinses according to the options

			No of rinses with the options										
			Normal	Half load	Super rinse	Night cycle	Easy-ironing	Exclusion of spin	Super rinse and half load	Super rinse and night cycle	Night cycle and half load	Night cycle, super rinse and half load	Sensitive
PROGRAMMES	COTTON	Normal	3	2	5	6	6	6	4	8	5	7	4
		Eco – Energy label	3	2	5	6	6	6	4	8	5	7	4
		Very short	2	2	4	5	5	5	4	7	5	7	3
	SYNTHETIC FABRICS	Normal	3	-	5	4	4	4	-	6	-	-	4
		Eco – Energy label	3	-	5	4	4	4	-	6	-	-	4
		Very short	2	-	4	3	3	3	-	6	-	-	3
	DELICATES	Normal	3	-	5	3	-	3	-	5	-	-	4
		Eco – Energy label	-	-	-	-	-	-	-	-	-	-	-
		Very short	2	-	4	2	-	2	-	4	-	-	3

5.5 Display (some models)

The display shows the following information:

- ⇨ **three flashing digits**, when the appliance is switched on.
- ⇨ **the duration of the washing programme**, which appears after selecting it. This time corresponds to that necessary for the maximum load for every type of programme. After starting the programme, the time diminishes (and updates) by every minute.
- ⇨ **the end of the programme** indicated by a **"0"** (when it is possible to open the door).
- ⇨ **the delayed start**, selected by the relative button. After pressing the START/PAUSE button, the countdown starts and the delayed time diminishes by every hour. In the last 2 hours diminishes by 30min.
- ⇨ **an alarm code**, indicating anomalies in the functioning of the machine.

5.6 LEDs

The LEDs indicate different information according to the type of configuration; the End-of-cycle Led is featured in all models.

Type of Led	Functions
Pre-wash	Lights during selection mode if the programme includes the pre-wash phase, and during the execution of the pre-wash.
Wash	Lights during selection mode if the programme includes the wash phase, and during the execution of the wash.
Pre-wash/Wash	Lights during selection mode if the programme includes the pre-wash or wash phases, and during the execution of these phases.
Rinse	Lights during selection mode if the programme includes rinse phases, and during the execution of the rinse.
Spin	Lights during selection mode if the programme includes the spin phase, and during the execution of the spin.
Drain	Lights during selection mode if the programme includes the drain phase, and during the execution of the drain
Extra rinse	Lights when this option has been memorized (if included in the cycle) during the execution of the rinse.
Rinse hold	Lights if the programme includes the rinse-hold option and at the end of the cycle, when the appliance stops with water in the tub.
Current cycle	Lights during execution of the cycle
End of cycle	Lights when the programme has been completed; also used to display alarm conditions
Blocked filter	Lights at the end of the cycle if the drain filter is blocked.
Overdosing	Lights at the end of the cycle if an overdosing alarm of detergent occurs.
ON/OFF	Lights when the appliance is switched on
Door	↳ Lights when the door is locked by the interlock. ↳ Switches off when the door is locked. ↳ Flashes when the door is about to unlock (it is clear above all in models with safety device with PTC)
Time-to-end	Lights when the display shows the time-to-end

6 WASHING PROGRAMMES

6.1 Base programmes for Cotton / Linen: cold-30-40-60-90° (without options)

Phase		N.	Function	Time/ control	Movement	Heat. °C	Notes
Delay		-	Delayed start	Delay time	No Mov		
Pre-wash		0	Drain	VAE + 2"+ 6" pause	No mov		
		1	Water fill	P1 + QPW1 (*)	D55 from full		
		2	Cold wash	5'			Refill: P1
		3	Water fill	QPW2 (*)	D55		
		4	Heating	T		30°	Cold = 20°C
		5	Maintenance	10'			
		6	Drain + spin	VAE + 14" + 4,5'	C0		300/450/650 rpm
		7	Drain	20"	No Mov		
Wash		8	Cotton water fill	P1 + Qhl (*)	N55 from full		
		9	Cold wash	10'			Refill: P1+Qw
		10	Cotton heating	T	N55	20/30/40/ 60/87	
		11	Maintenance	4'(87°)/5'(20-40°) /10'(60°)	N55		
		12	Cotton heating	T	E55	30/40/60/ 87	
		13	Maintenance	14'(87°)/35'(20-40°) /20'(60°)	E55		
	Cooling	14	Cooling water fill	Qc (*)	D55		Only if >67°C
		15	Movement	2'			
		16	Drain	VAE + 14"	No Mov		
		17	Drain + spin	5'	C1		450/650/850 rpm
		18	Drain	20"	No Mov		No Mov
Rinses	**1st rinse**	19	Cotton water fill	P1	N 55 from full		
		20	Movement	5'			Refill: P1+Qn1
		21	Drain	VAE + 15"	No Mov		
		22	Drain + spin	5'	C2		450/650/850/1000rpm
		23	Drain	20"	No Mov		
	2nd rinse	24	Cotton water fill	P1+Qn2	N 55 from full		
		25	Movement	5'			Refill: P1+Qne
		26	Drain	VAE + 15"	No Mov		
		27	Drain + spin	5'	C2		450/650/850/1000rpm
		28	Drain	20"	No Mov		
	Last rinse (conditioner)	29	Cotton water fill	P1	N 55 from full		
		30	Movement	30"			
		31	Time water fill	Qn3			
		32	Movement	8'			Refill: P1
		33	Drain	VAE + 15"	No Mov		
		34	Drain + spin	9'	COT_CF		450/650/850/1000/ Max.
		35	Detach movement	1'	N55		

SW W1A3C005

Notes:

P1 time needed to 1st level water fill
(*) time water fills are changeable and calculated by the electronic on the basis of the delivery rate (see specific table)
T time needed to heat the water at the set temperature
" seconds
' minutes
VAE time needed to drain the water till "empty" position of anti- boiling (safety heater) pressure switch
Movement: in this column are described the drum movements at low speed and during spin. (See paragraph "drum movements")
The times of drain phases with spin cycle are indicative and do not take into consideration the intervention of antiunbalance and antifoam protections.

6.2 Cotton / Linen Cycles: 90 Eco, 60 - 40/50 “energy label” (without options)

Phase		N.	Function	Time/ Control	Movement	Heat. °C	Notes
Delay		-	Delayed start	Delay time	No Mov		
Pre-wash		0	Drain	VAE + 2”+ 6” pause	No Mov		
		1	Water fill	P1 + QPW1 (*)	D55 from full		
		2	Cold wash	5’			Refill: P1
		3	Water fill	QPW2 (*)	D55		
		4	Heating	T		30	Cold = 20°C
		5	Maintenance	10’			
		6	Drain + spin	VAE + 14” + 4,5’	C0		300/450/650 rpm
		7	Drain	20”	No Mov		
Wash		8	Cotton water fill	P1 + Qe (*)	N55 from full		
		9	Cold wash	10’			Refill: P1+Qwe
		10	Cotton heating	T	N55	67/50/44	E55 per 50°
		11	Maintenance	10’(67°) / 10’(50°) / 40’(44°)	E55		
		11a	Maintenance 44	T 15’ (44°)	N55 (44°)		Only for 45°C
		12	Cotton heating	T	E55	67/44	
		13	Maintenance	30’(67°)/(15’ - 50°)/ 20’(44°)	E55		N55 for 67°
		13a	Maintenance	5’	N55		Only for 50°C
			Maintenance	15’	E55		Only for 50°C
		14	Drain	VAE + 14”	No Mov		
		15	Drain + spin	5’	C1		450/650/850 rpm
		16	Drain	20”	No Mov		
Rinses	1st rinse	17	Cotton water fill	P1	N 55 from full		
		18	Movement	5’ (2xG22 a 60°)			Refill: P1+Qne
		19	Drain	VAE + 15”	No Mov		
		20	Drain + spin	5’	C2		450/650/850/1000rpm
		21	Drain	20”	No Mov		
	2nd rinse	22	Cotton water fill	P1 (C1≥850 g/’) P1+Qn2 (C1<850 g/’)	N 55 from full		
		23	Movement	5’			Refill: P1+Qne
		24	Drain	VAE + 15”	No Mov		
		25	Drain + spin	5’	C2		450/650/850/1000rpm
		26	Drain	20”	No Mov		
	Last rinse (conditioner)	27	Cotton water fill	P1	N 55 from full		
		28	Movement	30”			
		29	Time water fill	Qn3			Qn3e for cycle 60°
		30	Movement	8’			Refill: P1
		31	Drain	VAE + 15”	No Mov		
		32	Drain + spin	9’	COT_CF		450/650/850/1000/ Max.

SW W1A3C005

Notes:

P1 time needed to 1st level water fill
(*) time water fills are changeable and calculated by the electronic on the basis of the delivery rate (see specific table)
T time needed to heat the water at the set temperature
” seconds
‘ minutes
VAE time needed to drain the water till “empty” position of anti- boiling (safety heater) pressure switch
Movement: in this column are described the drum movements at low speed and during spin. (See paragraph “drum movements”)
The times of drain phases with spin cycle are indicative and do not take into consideration the intervention of antiunbalance and antifoam protections.

6.3 Base programmes for Synthetics Cycles: cold - 30- 40 – 50 - 60° (without options)

Phase		N.	Function	Time/ control	Movement	Heat. °C	Notes
Delay		-	Delayed start	Delay time	No Mov		
Prewash		0	Drain	VAE + 2"+ 6" pause	No mov		
		1	Water fill	P1 + QPW1 (*)	D 55 from full		
		2	Cold wash	5'			Refill: P1
		3	Water fill	QPW2 (*)	D 55		
		4	Heating	T		30°	Cold = 20°C
		5	Maintenance	10'			
		6	Drain + spin	VAE + 15" + 4,5'	C0		300/450/650 rpm
		7	Drain	20"	No mov		
Wash		8	Synthetics water fill	P1 + Qsy (*)	N 55 from full		
		9	Cold wash	5'			Refill: P1+Qy1
		10	Heating	T	N55 for T>40° E55 for T< / = 40°	20/30/40/ 50/60	Economy = 42°C
		11	Maintenance	10'			Economy = E55
		12	Heating	T	E55	30/40/50/ 60	Economy = 42°C
		13	Maintenance	15'			Economy = 25'
	Cooling	14	Cooling water fill	Qc (*)	N55		
		15	Movement	1'			
		16	Drain	VAE	No mov		
		17	Drain	1'	D55		
Rinses	**1st rinse**	18	Water fill	P1+ Qyr1 (*)	E55 from full		
		19	Movement	3'			Refill: P1
		20	Drain	VAE	No mov		
		21	Drain	1'	D55		
	2nd rinse	22	Water fill	P1+ Qyr2 (*)	E 55 from full		
		23	Movement	3'			Refill: P1
		24	Drain	VAE	No mov		
		25	Drain	1'	D55		
		26	Drain + spin	4'	C0		300/450/650 rpm
	Last rinse (softener)	27	Water fill	P1	E55 from full		
		28	Movement	30"			
		29	Time water fill	Qyr3			
		30	Movement	5'			Refill: P1
		31	Drain	VAE + 14"	No mov		
		32	Drain + spin	4,5'	SYN_CF		(max. 900rpm)
		33	Detach movement	1'	N55		Not for Economy

SW W1D00102

Notes:

P1 time needed to 1st level water fill
(*) time water fills are changeable and calculated by the electronic on the basis of the delivery rate (see specific table)
T time needed to heat the water at the set temperature
" seconds
' minutes
VAE time needed to drain the water till "empty" position of anti- boiling (safety heater) pressure switch
Movement: in this column are described the drum movements at low speed and during spin. (See paragraph "drum movements")
The times of drain phases with spin cycle are indicative and do not take into consideration the intervention of antiunbalance and antifoam protections.

6.4 Delicates Cycles: cold – 30° - 40° (without options)

Phase		N.	Function	Time/ control	Movement	Heat. °C	Notes
Delay		-	Delayed start	Delay time	No Mov		
Pre-wash		0	Drain	VAE + 2"+ 6" pause	No mov		
		1	Water fill	P1 + QPW1 (*)	D55 from full		
		2	Cold wash	5'			Refill: P1
		3	Water fill	QPW2 (*)	D55		
		4	Heating	T		30	Cold = 20°C
		5	Maintenance	3'			
		6	Drain	VAE + 15"	No mov		
Wash		7	Delicates water fill	P1 + Qdw1 (*)	D55 from full		
		8	Cold wash	1'	D55		Refill: P1+Qdw2
		9	Heating	T	D55	20/30/40	
		10	Maintenance	10'			
		11	Heating	T		20/30/40	
		12	Maintenance	10'			
		13	Drain	VAE	No mov		
		14	Drain	1'	D55		
Rinses	1st rinse	15	Water fill	P1+ Qrd1 (*)	D55		
		16	Movement	5'	D55		Refill: P1
		17	Drain	VAE	No mov		
		18	Drain	1'	D55		
	2nd rinse	19	Water fill	P1+ Qrd1 (*)	D55		
		20	Movement	5'	D55		Refill: P1
		21	Drain	VAE	No mov		
		22	Drain	1'	D55		
	Last rinse (softener)	23	Water fill	P1	D55 from full		
		24	Movement	30"			
		25	Time water fill	Qrd2 (*)			
		26	Movement	3'			Refill: P1
		27	Drain	VAE	No mov		
		28	Drain + spin	3,8'	DEL_CF		(450/700rpm)
		29	Detach movement	1'	N55		

SW W1D00102

Notes:

P1 time needed to 1st level water fill

(*) time water fills are changeable and calculated by the electronic on the basis of the delivery rate (see specific table)

T time needed to heat the water at the set temperature

" seconds

' minutes

VAE time needed to drain the water till "empty" position of anti- boiling (safety heater) pressure switch

Movement: in this column are described the drum movements at low speed and during spin. (See paragraph "drum movements")
The times of drain phases with spin cycle are indicative and do not take into consideration the intervention of antiunbalance and antifoam protections.

6.5 Wool Cycles: cold - 30° - 40°

Phase		N.	Function	Time/ control	Movement	Heat. °C	Notes
Delay		-	Delayed start	Delay time	No Mov		
Wash		0	Drain	VAE + 2"+ 6" pause	No mov		
		1	Wool water fill	P1 + Qwo (*)	Pwl_1 from full		
		2	Cold wash	1'			Refill:P1+Qwo1
		3	Heating	T		20/33/38	
		4	Maintenance	14'			
		5	Drain	VAE+14"	v		
Rinses	1st rinse	6	Water fill	P1	No mov		
		7	Time water fill	Qwor1 (*)	Pwl_1		
		8	Movement	3'			Refill:P1
		9	Drain	VAE+14"	No mov		
	2nd rinse	10	Water fill	P1	No mov		
		11	Time water fill	Qwor1 (*)	Pwl_1		
		12	Movement	3'			Refill:P1
		13	Drain	VAE+14"	No mov		
	Last rinse (softener)	14	Water fill	P1	No mov		
		15	Movement	30"	Pwl_1		
		16	Time water fill	Qwor2 (*)			
		17	Movement	5'			Refill:P1
		18	Drain	VAE+14"	No mov		
		19	Drain + spin	3,5'	WOOL_CF		(max. 1000rpm)

SW W1D00102

6.6 Hand wash Cycles: cold - 30° - 40°

Phase		N.	Function	Time/ control	Movement	Heat. °C	Notes
Delay		-	Delayed start	Delay time	No Mov		
Wash		0	Drain	VAE + 2"+ 6" pause	No mov		
		1	Wool water fill	P1 + Qwh (*)	No mov		
		2	Cold wash	1'	Pwl_4		Refill:P1+Qwh1
		3	Heating	T		20/33/38	
		4	Maintenance	14'			
		5	Drain	VAE+14"	No mov		
Rinses	1st rinse	6	Water fill	P1	No mov		
		7	Time water fill	Qwor1 (*)	Pwl_4		
		8	Movement	3'			Refill:P1
		9	Drain	VAE+14"	No mov		
	2nd rinse	10	Water fill	P1	No mov		
		11	Time water fill	Qwor1 (*)	Pwl_4		
		12	Movement	3'			Refill:P1
		13	Drain	VAE+14"	No mov		
	Last rinse (softener)	14	Water fill	P1	No mov		
		15	Movement	30"	Pwl_4		
		16	Time water fill	Qwor2 (*)			
		17	Movement	5'			Refill:P1
		18	Drain	VAE+14"	No mov		
		19	Drain + spin	3,5'	WOOL_CF		(max. 1000rpm)

SW W1D00102

Notes:

P1 time needed to 1st level water fill

(*) time water fills are changeable and calculated by the electronic on the basis of the delivery rate (see specific table)

T time needed to heat the water at the set temperature

" seconds

' minutes

VAE time needed to drain the water till "empty" position of anti- boiling (safety heater) pressure switch

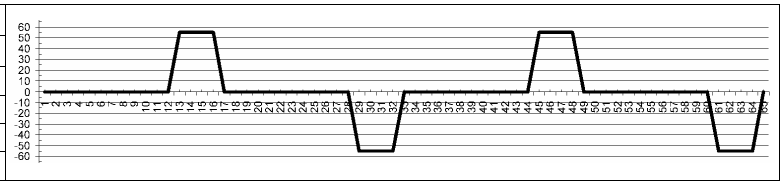
Movement: in this column are described the drum movements at low speed and during spin. (See paragraph "drum movements")

The times of drain phases with spin cycle are indicative and do not take into consideration the intervention of antiunbalance and antifoam protections.

6.7 Drum movements at low speed and during spin

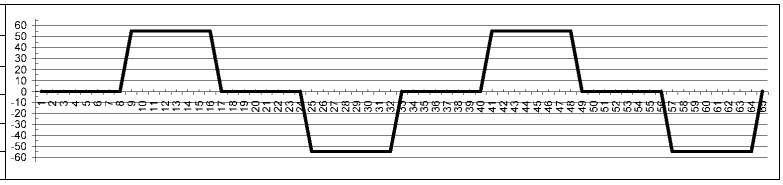
6.7.1 D55 Delicate movement

D55	
sec	**rpm**
12	0
4	55
12	0
4	-55



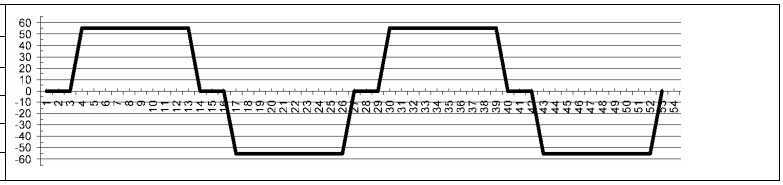
6.7.2 N55 Normal movement

N 55	
sec	**rpm**
8	0
8	55
8	0
8	-55



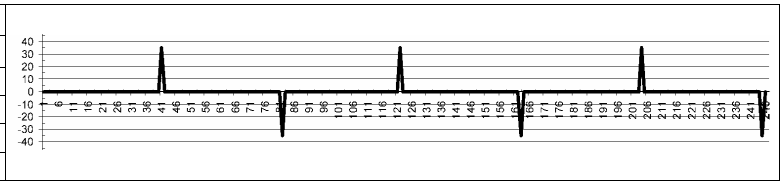
6.7.3 E55 Vigorous movement

E 55	
sec	**rpm**
3	0
10	55
3	0
10	-55



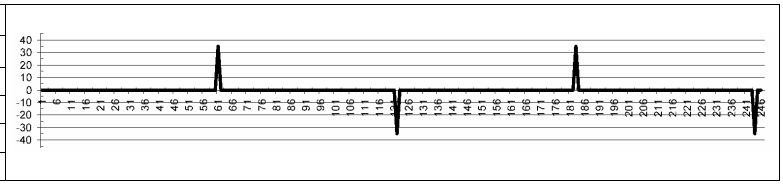
6.7.4 PWL_1 (wool) Delicate movement

PWL_1	
sec	**rpm**
40	0
1	35
40	0
1	-35



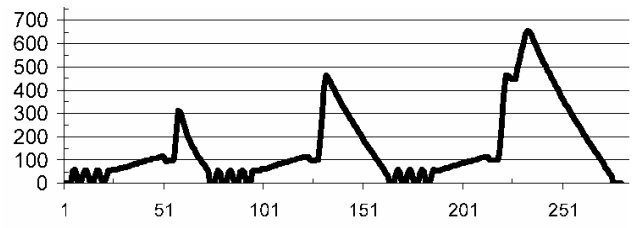
6.7.5 PWL_4 (hand wash) Delicate movement

PWL_4	
sec	**rpm**
57	0
1	35
57	0
1	-35



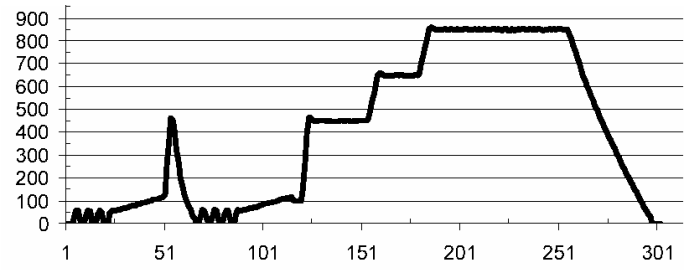
6.7.6 Cotton/Linen, Synthetics – C0 Intermediate Synthetics Prewash Spin

C0 (Prewash)		
rpm	**sec.**	**AF**
FUCS	x	no
300	0	no
FUCS	x	no
450	0	no
FUCS	x	no
450	5	no
650	0	no



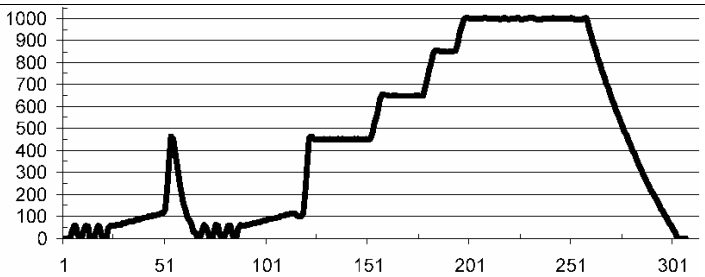
6.7.7 C1 Cotton/Linen Wash Spin

C1 (wash)		
rpm	**sec**	**AF**
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	30	AF
650	15	AF
850	10	AF
850	60	no



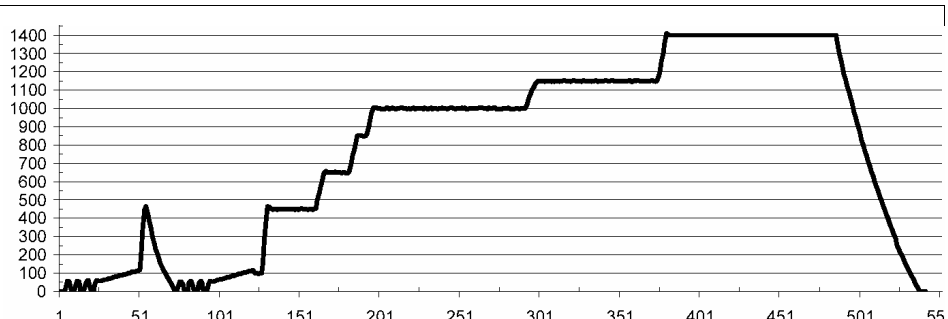
6.7.8 C2 Cotton/Linen Intermediate Spin

C2 (intermediate)		
rpm	**sec**	**AF**
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	30	AF
650	20	AF
850	10	AF
1000	60	no



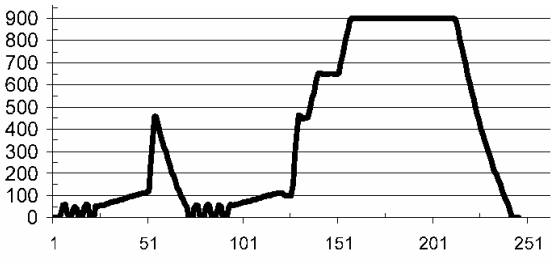
6.7.9 COT_CF Cotton/Linen Final Spin

COT_CF (cotton final)		
rpm	**sec**	**AF**
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	30	AF
650	15	AF
850	5	AF
1000	95	no
1150	75	no
1400	110	no



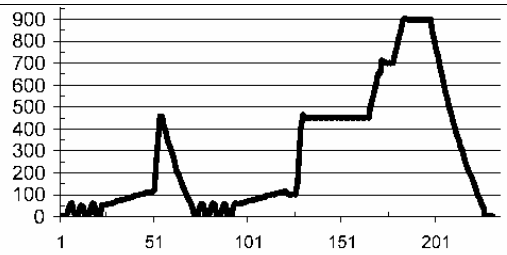
6.7.10 SYN_CF Synthetics Intermediate and Final Spin

SYN_CF (intermediate/final)		
rpm	**sec**	**AF**
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	5	no
650	10	no
900	55	no



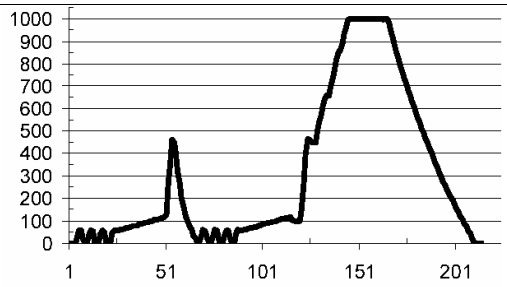
6.7.11 DEL_ CF Delicates Final Spin

CF (delicates final)		
rpm	**sec**	**AF**
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	35	AF
700	5	AF
900	20	AF



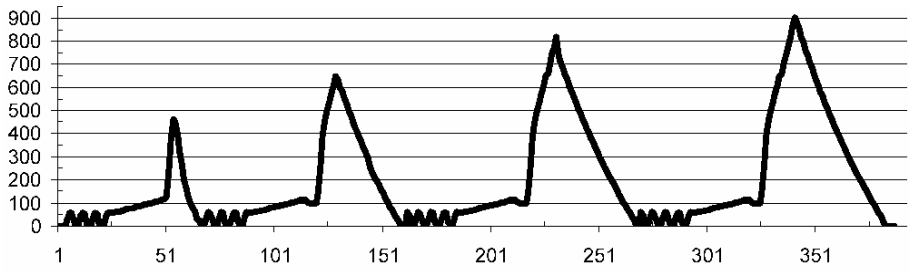
6.7.12 WOOL_CF Hand Wash and Wool Final Spin

CF (wool final)		
rpm	**sec**	**AF**
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	5	AF
650	1	AF
850	1	AF
1000	20	no



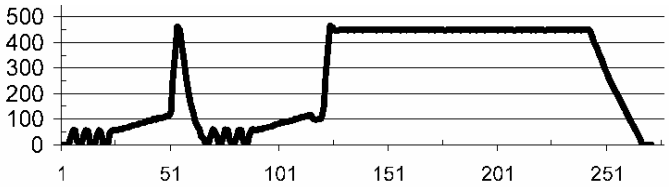
6.7.13 Easy iron Impulse Cycle

EASY_IRON_IMP		
rpm	**sec**	**AF**
FUCS	x	no
450	0	no
FUCS	x	no
650	0	AF
FUCS	x	no
800	0	AF
FUCS	x	no
900	0	AF



6.7.14 Intermediate Spin for Cotton/Linen CSR with Super-rinse option

CSR		
rpm	**sec**	**AF**
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	120	AF



Notes:
AF indicates if antifoam function is active
FUCS antiunbalance function before spin phase
x variable duration

- In the diagrams the speed is indicated as rotations per minute and the time in seconds

6.8 Control of water level in tub

The water fill is carried out in two phases:

- **level fill:** is controlled by the closure of 1st level pressure switch in full position
- **time fill:** the duration is calculated by the electronic to fill the set quantity.

The different levels are determined by the model configuration and depend on the type of tub used.

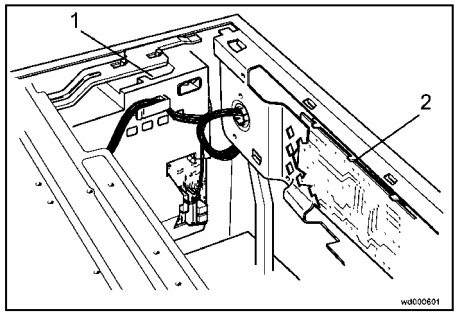
6.8.1 Time water fill

Type	Description of time fill	G20 litres	G19 litres	G21/2 litres	G18 litres
	Levels for COTTON/LINEN				
Qpw1	First prewash water fill *(all cycles)*	3,5	5,0	3,5	5
Qpw2	Prewash water fill after cold wash *(all cycles)*	3,5	3.5	3,5	3,5
Qhl	Normal water fill/half load	3,5	5,0	3,5	0
Qhl2	Half load water fill for "VERY SHORT" cycle	4,5	5,5	4,5	5,5
Qe	Water fill for "energy label" cycle	4,5	2,5	3,5	0
Qec	Water fill for maintenance cold wash "energy label" cycle	0	0	0	0
Qwe	Refill for "energy label" cycle if prewash has not been selected	0	0	0	0
Qw	Wash refill if the cycle is not "energy label"	1,5	1,0	1,5	2,0
Qc	Cooling water fill	3,0	4,0	3,0	4,0
Qs	"Stains" compartment water fill	1,5	1,0	1,5	1,5
Qk	Water fill for "quick cycle" rinses	12,5	12,0	12,5	11,0
Qn1	Normal water fill for 1st rinse	7,5	8,0	8,5	7,0
Qn2	Normal water fill for other rinses	9,0	9,0	9,5	7,0
Qn3	Normal water fill for last rinse	10,0	10,0	12,5	7,0
Qn3e	Water fill for economy last rinse	10,0	10,0	12,5	7,0
Qne	Normal water fill for rinse of "energy label" cycle	4,0	7,0	4,0	0
Qne_60	Water fill for rinse of "energy label" cycle	4,0	7,0	4,0	0
Qsr1	Water fill for super-rinse and night cycle if no spin has occurred	5,5	8,0	5,5	7,0
Qsr2	Water fill for super-rinse and night cycle if spin has occurred	6,0	6,0	6,0	8,0
	Levels for SYNTHETICS				
Qsy	Wash water fill	1,0	0	1,0	3,0
Qsy1	Wash water fill for VERY SHORT cycle	3,5	2,5	4,0	2,5
Qy1	Wash water fill if prewash has not been selected	2,0	3,0	2,0	3,0
Qyr1	Normal water fill for 1st rinse	8,0	8,0	8,5	6,0
Qyr2	Normal water fill for other rinses	8,0	8,0	8,5	6,0
Qyr3	Normal water fill for last rinse	9,5	8,0	10,0	6,0
	Levels for DELICATES				
Qdw1	Wash water fill	8,5	9,0	9,0	9,5
Qdw2	Wash refill	0	0	0	0
Qrd1	Normal water fill for 1st rinse and other rinses	10,0	9,5	11,0	9,0
Qrd2	Normal water fill for last rinse	11,0	11,5	11,5	10,5
	Levels for WOOL				
Qwo	Wash water fill	10,0	8,5	10,5	9,0
Qwo1	Wash refill	0	0	0	0
Qwor1	Normal water fill for 1st rinse and other rinses	8,0	9,5	8,5	7,5
Qwor2	Normal water fill for last rinse	8,0	10,0	8,5	8,0
	Levels for HAND WASH				
Qwh	Wash water fill	10,0	8,5	10,5	8,5
Qwh1	Wash refill	0	10,0	0	0

(The data in the table are indicative)

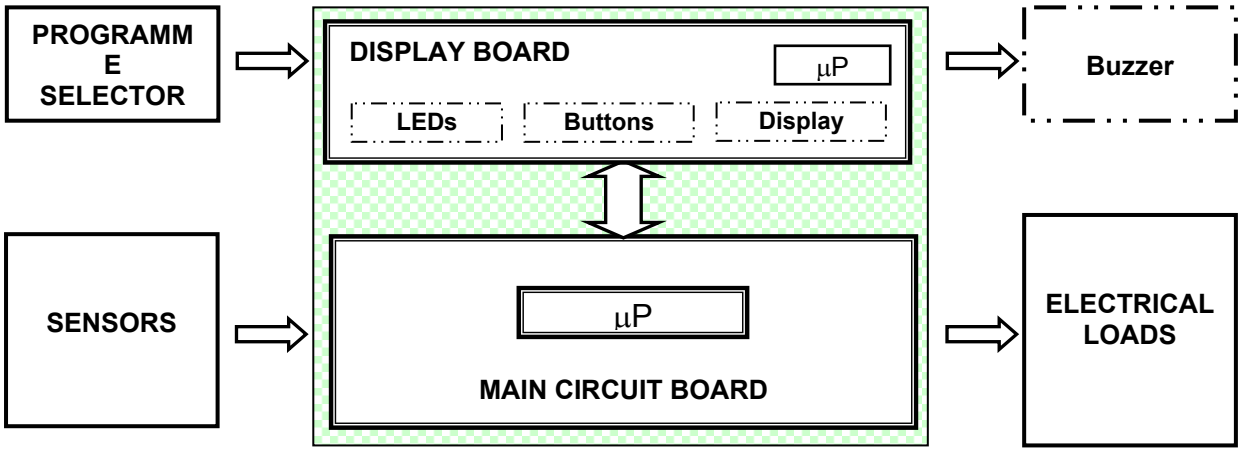
7 TECHNICAL CHARACTERISTICS

7.1 EWM1000 Plus Electronic control



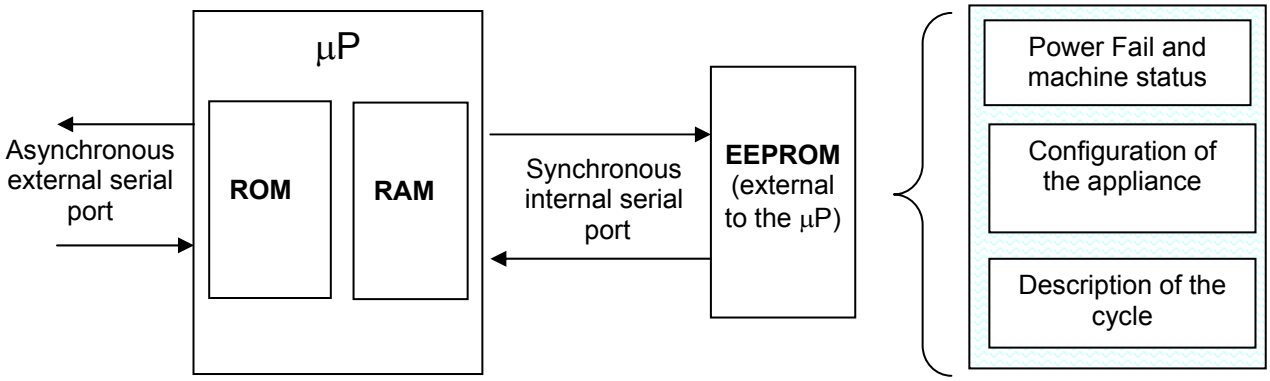
The EWM1000 Plus electronic control consists of a main PCB (1) and a control/display board (2).

7.1.1 Functions of the circuit board



- ⇨ The circuit board receives signals relative to the cycle settings via the control/display board. The buttons, the LEDs and the display are also mounted on this board which is connected to the programme selector.
- ⇨ The board also powers all the electrical components (solenoid valves, washing motor, drain pump, heating element, door interlock).
- ⇨ The board controls the temperature of the washing water via an NTC sensor, as well as the speed of rotation of the washing pump according to the signal received from the tachometric generator.
- ⇨ It checks the water level in tub via the level pressure switch and the safety one.

7.1.2 Memory in the control system



The main circuit board features an EEPROM memory (external to the microprocessor) which stores in memory data relative to the configuration, description of the cycle, cycle status in case of a power failure, and any alarm conditions.
The configuration data (entered in the factory using a computer with a DAAS interface) determine the functionalities of the appliance (number and type of programmes, options, LEDs etc).

The overall structure of the microprocessor memory on the main PCB is subdivided into three sections:

ROM This area of memory contains the software with the general instructions that control the operation of the appliance, such as those of the electrical components and alarms. The ROM is set up by the manufacturer of the microprocessor, and cannot be modified.

RAM This part of memory contains all the variables used during the execution of the wash programme, which are written in dynamic format. The RAM can be read using a DAAS interface.

EEPROM This area of memory contains:

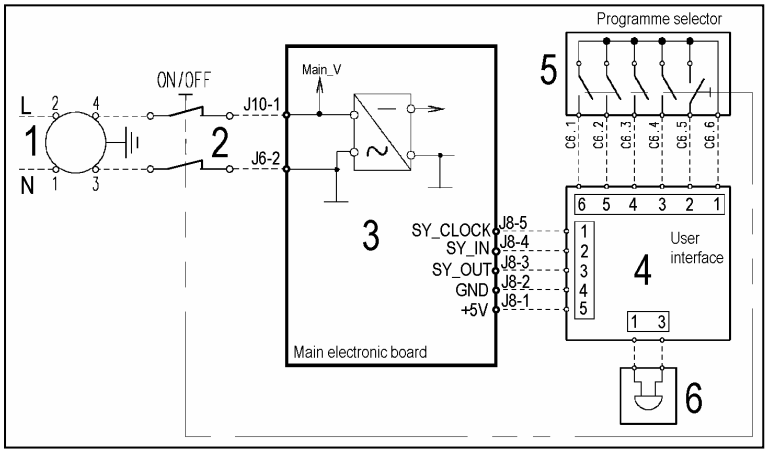
→ the data necessary to restart the appliance in case of a power failure;

→ the parameters for the wash cycle, such as water fill level, speed and type of motor movement, and the temperature during the various phases of the wash cycle. Once written, this data is protected and, normally, can be read only using a DAAS interface;

→ data relative to the configuration of the appliance, such as the speed of the final spin phase, the volume of the tub, the type of washing system, etc. This data may be entered either via a DAAS interface or via the control/display board.

7.2 Power supply and programme selection

The main board (3) is powered by the interference suppressor (1) and by the closure of the contacts of the main switch (2). The affected connectors are J6-2 (neutral) and J10-1 (line).
The control/display board (4) is powered at 5V by the main board: through the programme selector (5) it is possible to select the programme. The selection of the options / start is performed through the board buttons (4).
The buzzer (if featured) (6) is powered by the display board.



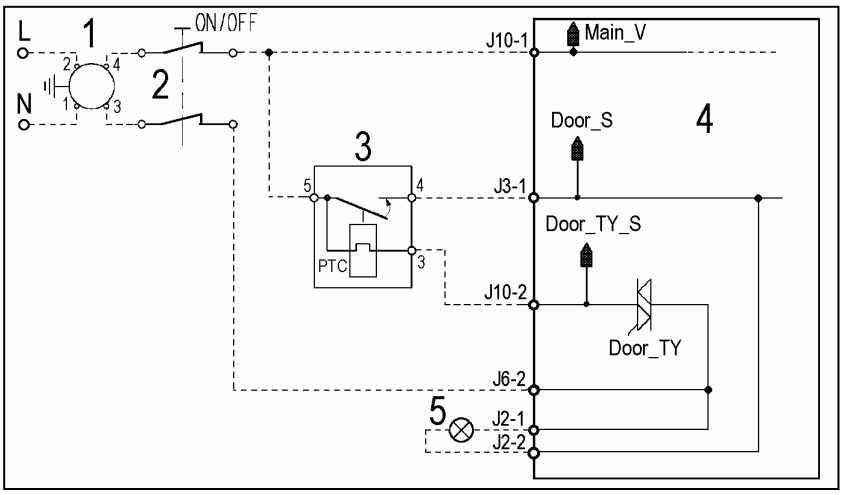
7.3 Door interlock

There are two types of door interlock:

- voltmetric with PTC: it is always necessary to wait from 1 to 3 minutes before opening the door.
- instantaneous: the door can be opened as soon as the cycle ends.

7.3.1 Voltmetric interlock with PTC

1. *Suppressor*
2. *Main switch (button or programme selector)*
3. *Door interlock*
4. *Main PCB*
5. *Door pilot lamp closed*



- **Operating principle**

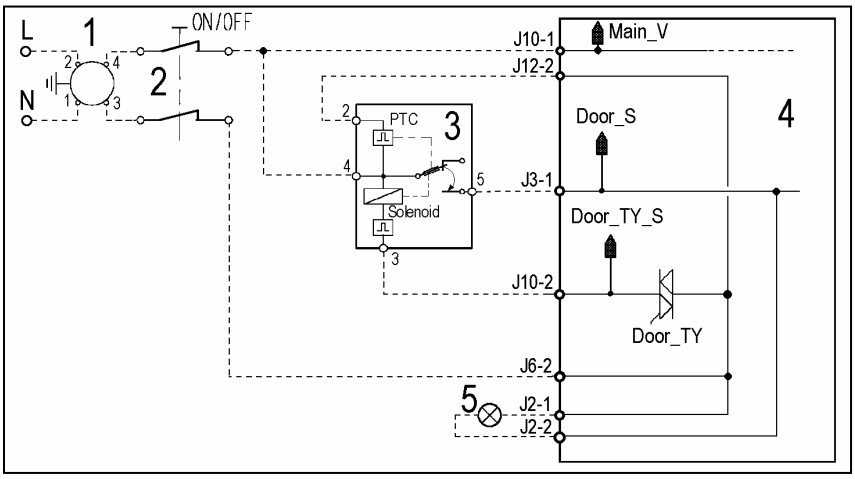
- When the washing programme is started by pressing the START/PAUSE button, the bi-metal PTC (contacts 3-5) is powered by the triac on the PCB (J6-2 connector): after 2 – 4 seconds, this closes the switch (5-4) which powers the electrical components of the appliance (only if the door is closed).
- The door interlock prevents aperture of the door while the appliance is in operation.
- At the end of the washing programme, the PCB disconnects the interlock from the power supply, but the door remains locked for 1 to 2 minutes (PTC cooling time).

Door locked" pilot lamp

- Certain models feature a pilot lamp which lights to indicate that the door is locked. This pilot lamp switches off when the door can be opened.

7.3.2 Instantaneous door interlock

1. *Suppressor*
2. *Main switch (button or programme selector)*
3. *Door interlock*
4. *Main PCB*
5. *Door pilot lamp off*



- **Operating principle**

- When the appliance is switched on, the ON/OFF switch closes and the bi-metal PTC (contact 4-2) is powered; the door, however, is not locked.
- When the programme starts (START/PAUSE button), the PCB transmits a 20 msec voltage signal to contacts 4-3 of the solenoid valve (J10-2 connector of the board) (at least 6 seconds must elapse after switching on); this signal locks the door and, at the same time, closes the main switch (contacts 4-5) which powers all the components in the appliance.

- At the end of the programme, the PCB transmits two 20 msec signals (at an interval of 200 msec).
  - the first signal does not release the door.
  - the second signal (which is transmitted only if the system functions correctly) releases the door interlock and at the same time the contacts of the main switch are opened.

- **Conditions necessary for door release**

- Before transmitting the door release signals, the main PCB checks for the following conditions:
- the drum must be stationary (no signal from the tachometric generator)
- the water level must not be higher than the lower edge of the door
- the temperature of the water must not exceed 40°C.

- **Automatic release device**

- In the event of a power failure, if the appliance is switched off, or if the solenoid should malfunction, the bi-metal PTC cools over a period of 1 to 4 minutes, and then releases the door.

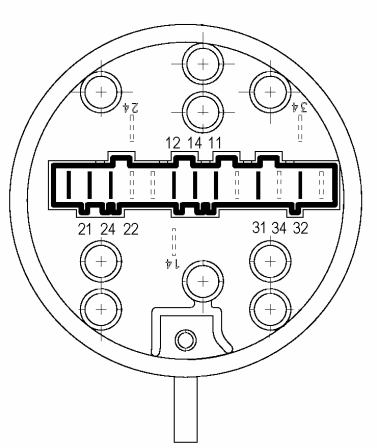
- **“Door locked” pilot lamp**

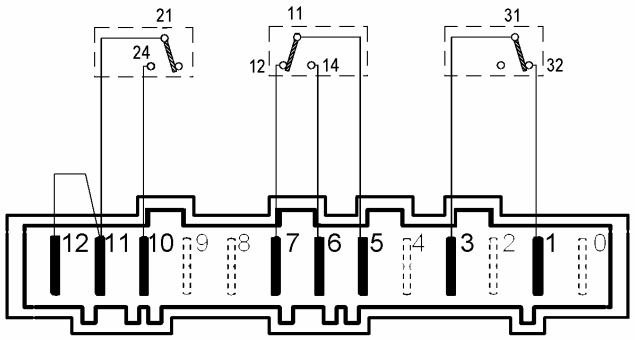
- Certain models feature a pilot lamp which lights to indicate that the door is locked. This pilot lamp switches off when the door can be opened.

7.4 Control pressure switch for water level in the tub

Control of the water level is performed by a two or three-level pressure switch which functions as follows:

- contact **11-14**: anti-boiling safety level
- contact **21-24**: first level
- contact **31-32**: anti-overflow safety level *(not all models)*



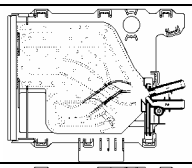
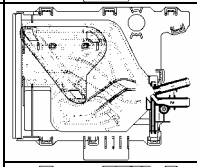
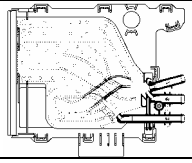


7.4.1 Pressure switch settings

	Full (mm)	Refill (mm)	Full (mm)	Refill (mm)
Anti-boiling level	60± 3	35± 3	55± 3	35± 3
1st level	95± 3	65± 3	80± 3	55± 3
Anti- overflow level	390± 15	240±50	390± 15	240±50

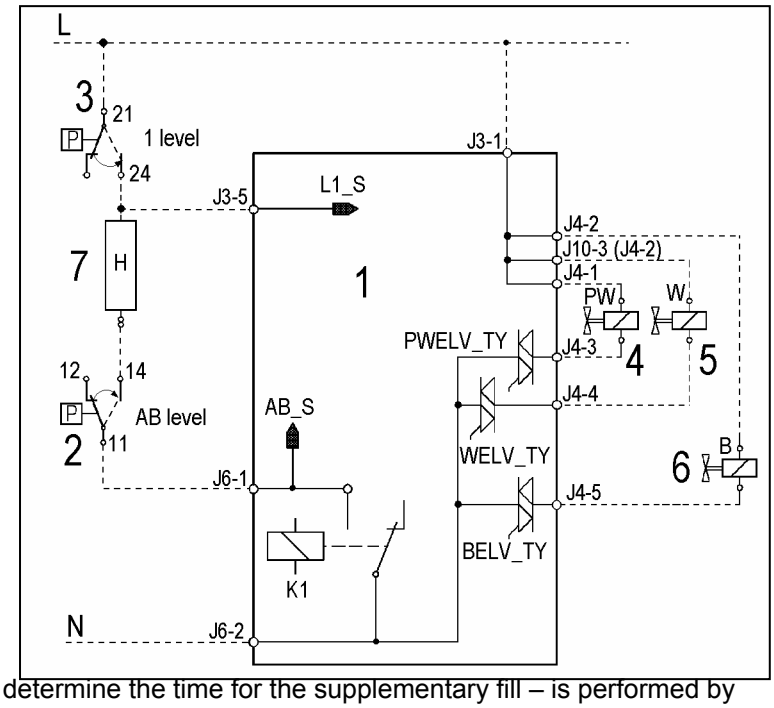
7.5 Detergent dispenser

The EWM 1000 plus electronic system can control different types of dispensers:

Type	Detergent dispenser		No. of solenoid valves
3 compart-ments		Pre-wash/Stains – Wash – Conditioner *(pre-wash and stain are in alternance)*	2
4 compart-ments		Pre-wash/Stains – Wash – Bleach - Conditioner *(the pre-wash/stain and conditioner compartment are linked together with a "intersection")*	2
		Pre-wash/Stains – Wash – Bleach - Conditioner *(pre-wash and stain are in alternance)*	3

7.6 Water fill system

The solenoid valves are powered by the PCB via two or three triacs. The status of the pressure switch (empty/full) is detected by two “sensing” lines”.



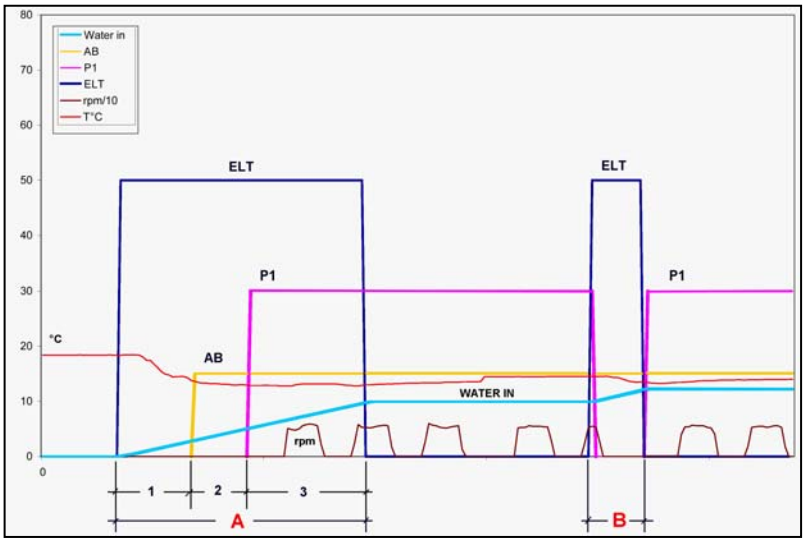
1. PCB
2. Anti-boiling level
3. 1st level
4. Pre-wash solenoid
5. Wash solenoid
6. Bleach solenoid (some models)
7. Heating element
AB_S Anti-boiling level sensor
L1_S 1st level sensor

7.6.1 Calculation of flow rate

Calculation of the capacity – necessary to determine the time for the supplementary fill – is performed by measuring the time that elapses between the closure of the anti-boiling contact on FULL and the closure of the 1st level contact.

Flow rate = $\frac{\textbf{\textit{Volume}}}{\textbf{\textit{Time (T1-T2)}}}$	***Volume*** = Volume of the tub between the two levels (anti-boiling and 1st level) ***T1 –T2 =*** The time that elapses between the closure of the anti-boiling and 1st level contacts on FULL

- **Water fill diagram**

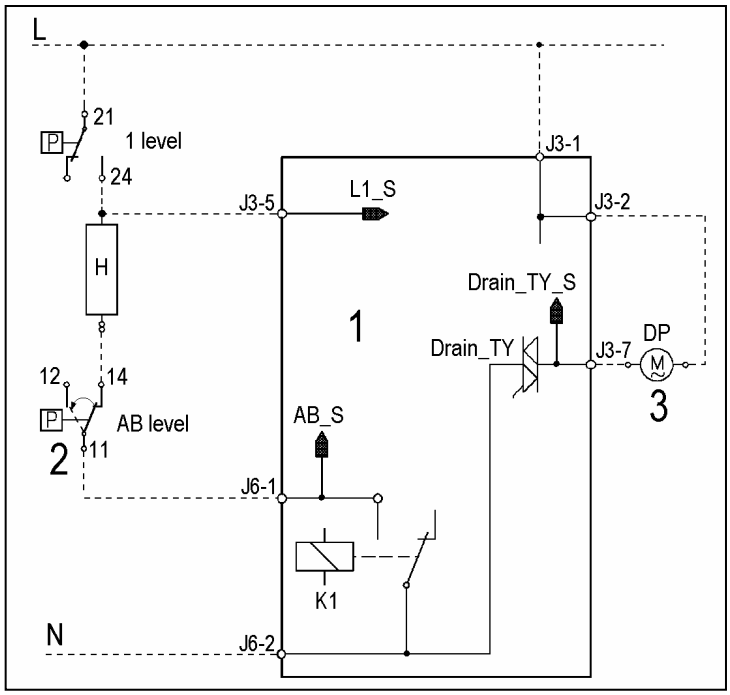


ELT = solenoid valve
P1 = 1st level
AB = anti-boiling level
rpm = drum rotation speed
Water in = water fill

Phase A: The phase during which the initial fill takes place:
1. Water fill until the anti-boiling pressure switch closes on FULL.
2. Water fill until the 1st level pressure switch closes on FULL: the delivery of the solenoid is calculated during this phase.
3. Water fill for time **Q**, which varies according to delivery and cycle phase.

Phase B: If the 1st level pressure switch returns to EMPTY, a supplementary fill is performed until the pressure switch returns to close on FULL. This phase may be followed by a further timer-controlled fill.

7.7 Drain pump



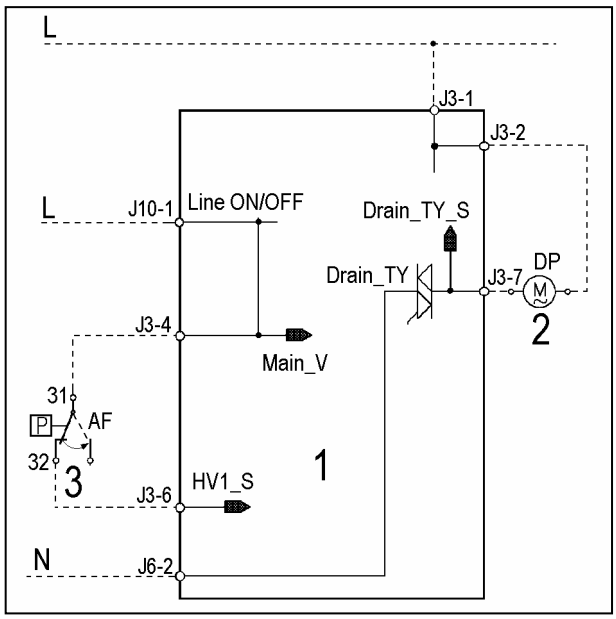
1. PCB
2. Anti-boiling pressure switch
8. Drain pump

AB_S Anti-boiling level sensor

The PCB powers the drain pump via a triac as follows:

- for a pre-determined period.
- until the anti-boiling pressure switch closes on EMPTY, after which the pump is actioned for a brief period or passes to the subsequent phase.

7.8 Anti-flooding device



1. PCB
8. Drain pump
9. Anti-overflow pressure switch

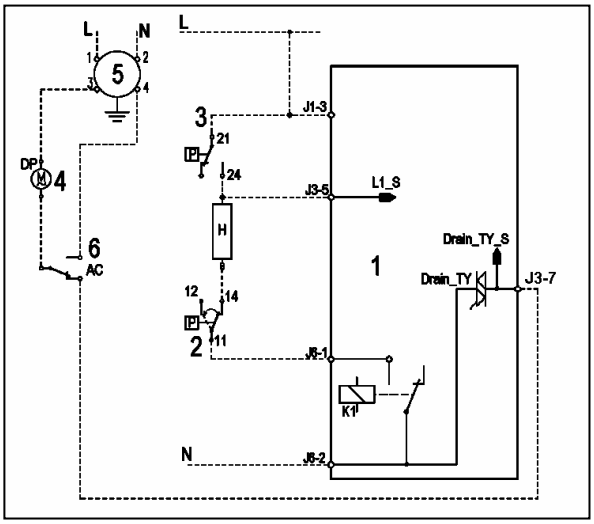
HV1_S Anti-overflow level sensor

The third pressure switch level (if featured) is used as an anti-overflow safety device: if the pressure switch contact should open in the FULL position, the PCB actions the drain pump until the pressure switch returns to the EMPTY position.

7.9 Water Control (not in all models)

The Water Control system is a sensor located in contact with the base frame. The sensor detects water leaks inside the machine (not only during normal operation, but also when the unit is off and plugged in) and starts the drain pump.

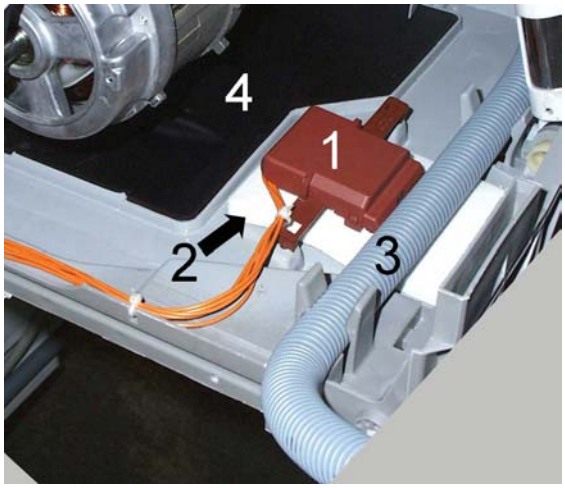
1. *Main board*
2. *1st LEV. Pressure switch*
3. *Anti-boiling pressure switch AE*
4. *Drain pump*
5. *Anti-interference filter*
6. *Water Control*



Besides supporting the various components on the appliance (drain pump, recirculation pump, shock absorbers, etc.), the base frame is designed to be a container that collects any water leaks that may occur (from the tub, from a tube or pipe, etc.). These leaks are directed into an area where a float is installed. When this float is raised by water, it actuates a microswitch that starts the drain pump. When the switch is tripped, an alarm is also signalled (if the machine is switched on).

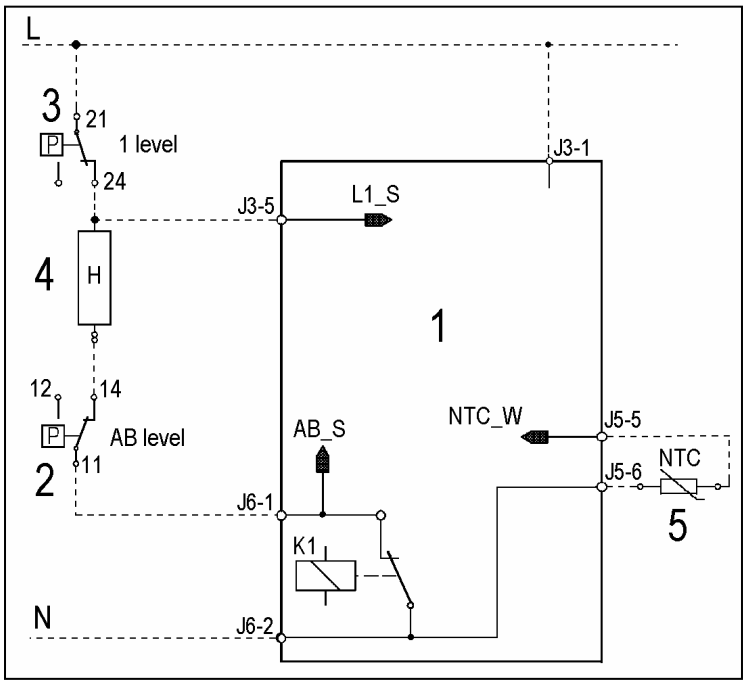
Important: When replacing the drain pump or tube, arrange the tube so that it doesn't interfere with the float.

1. *microswitch actuated by float*
2. *float*
3. *drain tube*
4. *cover*



7.10 Heating

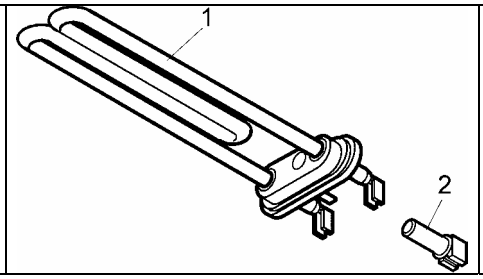
1. PCB
2. Anti-boiling pressure switch
3. 1st level pressure switch
6. Heating element
7. NTC temperature sensor
K1 Relay
AB_S Anti-boiling level sensor
L1_S 1st level sensor

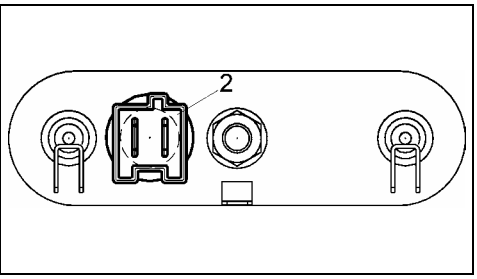


The heating element is powered by a relay on the PCB via the contacts of the pressure switch when closed on FULL.

7.10.1 Heating element

1. Heating element (1950W)
2. NTC-Sensor





7.10.2 Temperature sensor

The temperature is controlled by the PCB by means of a NTC temperature sensor.

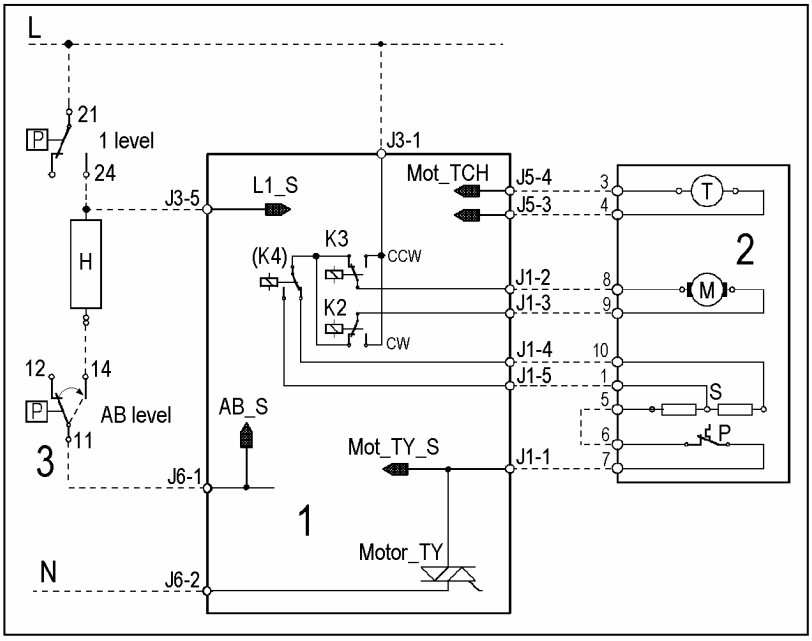
TEMPERATURE (ºC)	RESISTANCE(Ω)		
	Nominal value	Maximum value	Minimum value
20	6050	6335	5765
60	1250	1278	1222
80	640	620	660

7.11 Motor

1. *PCB*
2. *Motor*
3. *Anti-boiling/anti-foam pressure switch*

M = rotor
P = motor safety cut-out
S = stator
T = tachometric generator

AB_S Anti-boiling/anti-foam level sensor



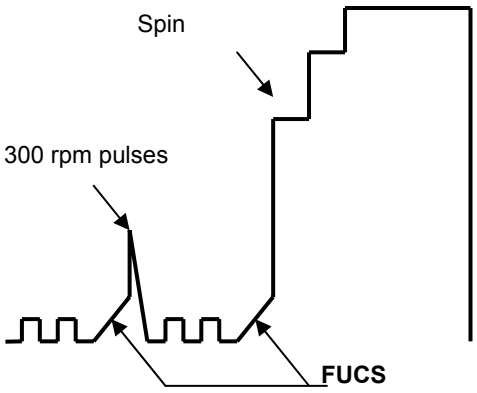
7.12 Power supply to motor

The PCB powers the motor via a triac. The direction of rotation is reversed by switching of the contacts on the two relays (K2-K3), which modify the connection between the rotor and the stator.
In certain models (1200-1600rpm), a third relay (K4) is used to power the stator (full or half field) according to the spin speed
The speed of rotation of the motor is determined by the signal received from the tachometric generator.
During the spin phases, the microprocessor, depending on the software configuration, may perform the anti-foam control procedure (if featured) and the anti-unbalancing control procedure.

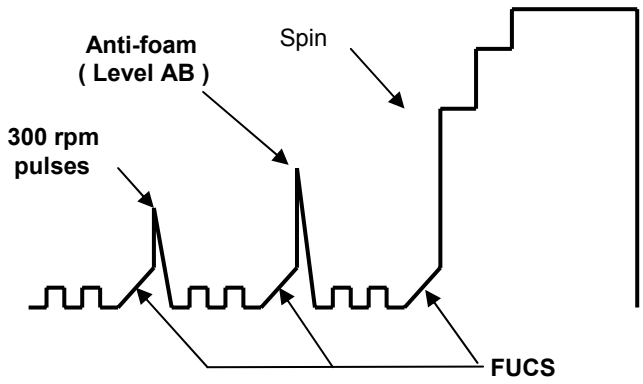
7.13 Anti-foam control system

The anti-foam control procedure (if featured) is performed via the anti-boiling pressure switch (AB).

Spin phase without foam



Spin phase with little foam

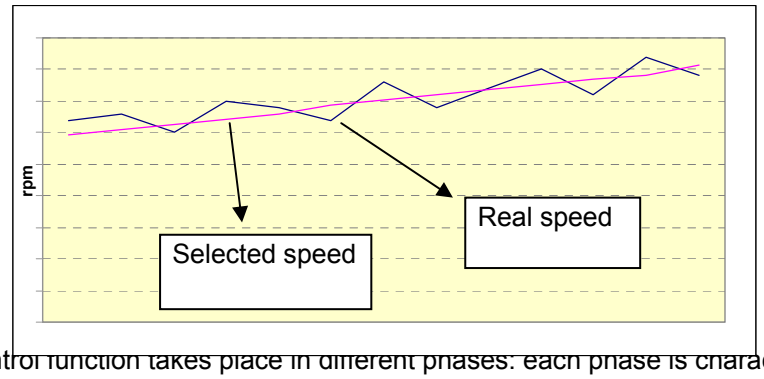


- **Spin with little foam:** if the contact of pressure switch AB closes on FULL, the spin phase is interrupted; the drain pump continues to operate and, when the contact returns to EMPTY, the spin phase is resumed.
- **Spin with excessive foam in the tub (critical situation):** The control system detects whether the pressure switch commutates 5 times to FULL. In this case, the spin phase is skipped, and a one-minute drain cycle is performed with the motor switched off; in the case of a washing phase, a supplementary rinse is added.

7.14 "FUCS" (**F**ast **U**nbalance **C**ontrol **S**ystem)

The control procedure for unbalanced loads is performed dynamically, before each spin cycle, as follows:

- The phase begins at a speed of 55 rpm; the speed can never fall below this threshold, otherwise the check is repeated.
- At intervals of 300 ms, the balance is calculated and compared with predetermined limits. If the value is less than the lower limit, the speed of the drum is increased by a certain value depending on the transmission relation between motor pulley/drum; if the unbalancing is higher, it is decreased by the same value. The reduction in the speed of the drum distributes the washing correctly; this procedure is repeated until the wash load is completely balanced.
- Correct balancing of the wash load is achieved at a speed of 115 rpm, after which the spin cycle begins.



The Unbalancing Control function takes place in different phases: each phase is characterized by:

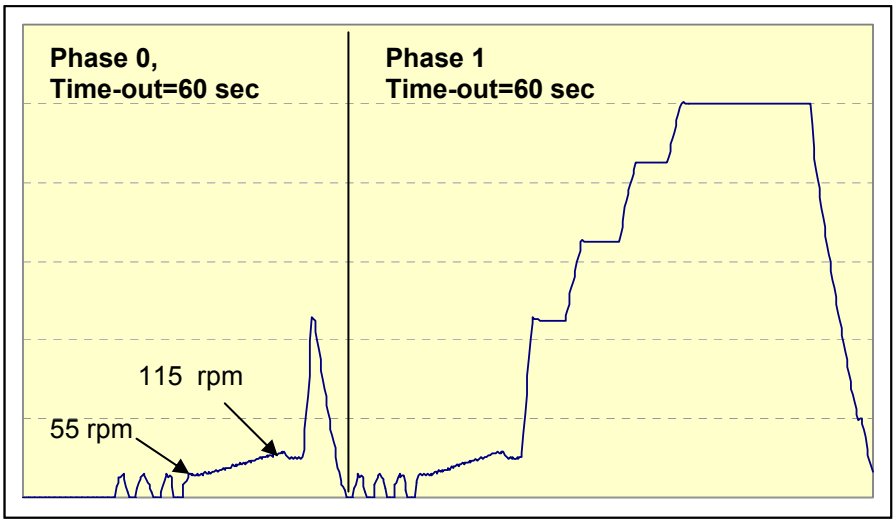
- *an unbalancing index (0-1-2-3)*
- *an unbalancing threshold value (ex: 350, 650, 850, 1200rpm)*
- *a time out (max. time)*

- **Ending of the FUCS balancing phase**

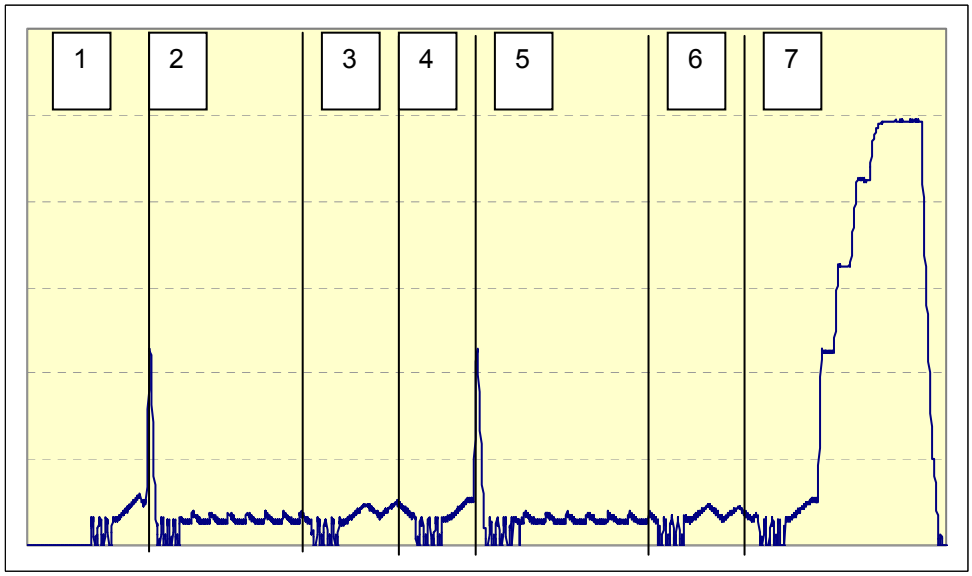
The phase is ended when:

- The drum rotation speed is 115 rpm (or 85rpm in some cases of unbalancing index). In this case the spin is performed.
- In some cases the optimal balancing value is not reached: a reduced spin is performed depending on the unbalancing.
- In the worst case, in which all phases are not sufficient to reach a minimum balancing value, the spin is not performed.

- **Example of perfect balancing**



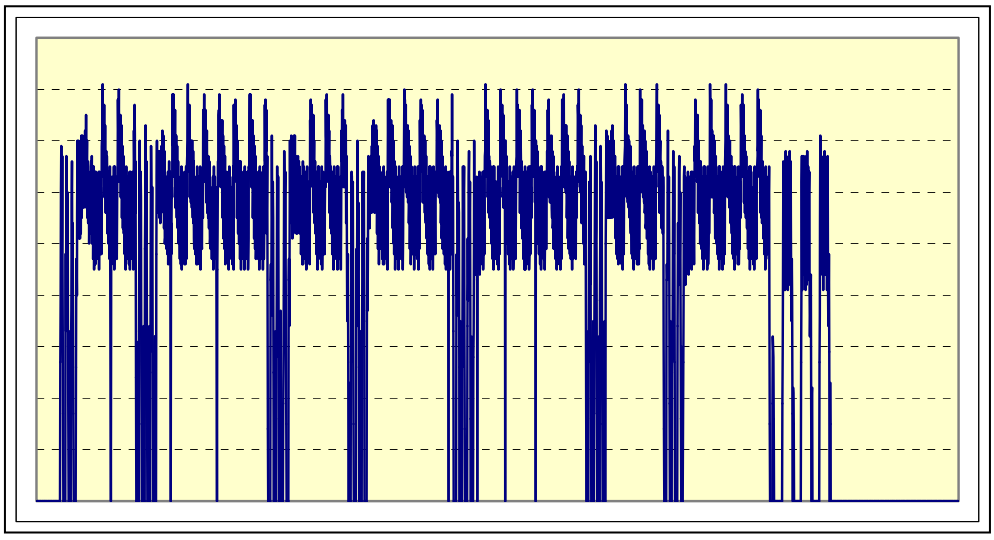
- **Balancing in the available longer interval**



Phase	Unbalancing index	Time-out (sec)
1	0	60
2	1	120
3	2	60
4	3	90
5	1	120
6	2	90
7	3	90

- **Unbalancing after all phases**

In this case the spin (or impulse) is not performed.

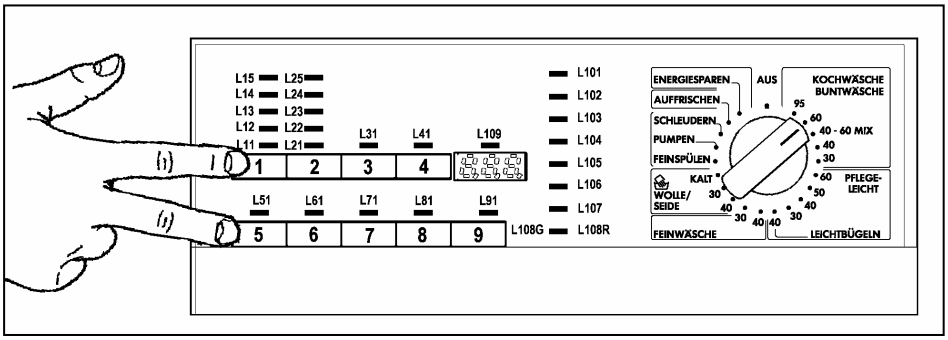


8 DEMO Mode

A special cycle has been created for demonstration of the operation of these appliances in retail outlets without connecting the appliance to the water supply. In this way, the salesman can select any programme; after starting the cycle by pressing START, the appliance will perform certain phases only, and will skip those which cannot be performed (water fill, drain, heating).
The cycle takes place as follows:

- the door locking device is actioned in the normal way (i.e. the door remains locked while the appliance is in operation, and can be opened at the end of the cycle or in pause mode)
- motor: all low-speed movements are enabled, while the pulse signals and the spin cycle are excluded
- the water fill solenoids and the drain pump are disabled
- display: since the phases of the cycle take place in rapid succession (1 second of the demo cycle is equivalent to 1 minute of the actual cycle), the time-to-elapse decreases by 1 unit per second. Remember that the time-to-elapse does not always correspond to the actual cycle time
- alarms: for reasons of safety, the following groups of alarms remain enabled: E40 (door closed), E50 and E90 (communication between the boards/configuration).

8.1 Demo mode setting



- Switch the appliance off
- Press buttons **1** and **5** simultaneously and then, holding them down, switch the appliance on by rotating the programme selector of **two positions clockwise**
- Hold buttons **1** and **5** down until the LEDs start flashing (about 5 seconds).

8.2 Exiting demo mode

- To exit demo mode, switch the appliance off.

9 DIAGNOSTICS SYSTEM

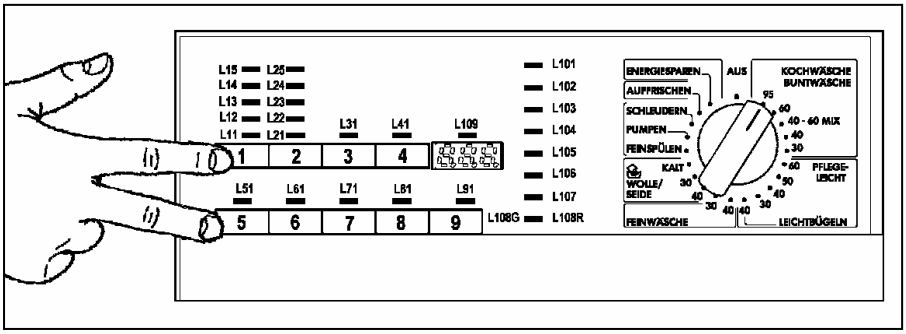
9.1 Access to diagnostics system

Using a single procedure, it is possible to access to the diagnostics system. After accessing this function, the following operations can be performed:

- control of the operation of each of the components in the appliance
- read / cancel the alarms

The diagnostics cycles are available only if the communication between the main PCB and the display board is correct; moreover there should not be configuration errors of the appliance.

To access:



1. Cancel the set programme and switch the appliance off.

2. Press buttons **1** and **2** simultaneously and then, holding them down, switch the appliance on by rotating the programme selector of **one position clockwise**.

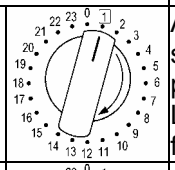
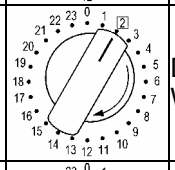
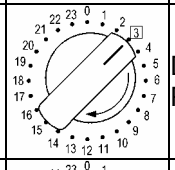
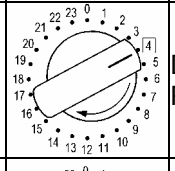
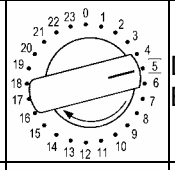
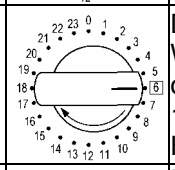
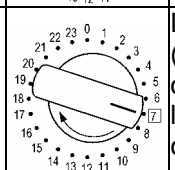
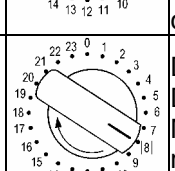
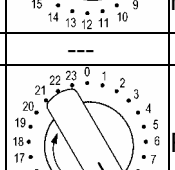
In the first position the function test of the buttons and the corresponding LEDs is performed; by rotating the programme selector **clockwise** the operation diagnostics of each component and the reading of the alarms is carried out.

9.2 Exiting diagnostics system

↳ To exit the diagnostics system switch the appliance off, on and then off again.

9.3 Phases of the diagnostics test

Independently of the type of selector, after activating the diagnostics system, the operation diagnostics of the different components and the reading of the alarms can be performed, by rotating the selector **clockwise**.
In models with digit the code of the selector position is displayed for a second.
In the diagnostics cycle all alarms are activated. If during the cycle operation an alarm occurs, the appliance blocks and the LEDs (and the display) flash indicating the relative code.
.

Diagnostics phases					
Selector position		**Components actioned**	**Operating conditions**	**Function checked**	**Displayed parameters (1)**
1		All the LEDs light in sequence. When a button is pressed, the corresponding LED lights (and the buzzer, if featured, sounds)	Always activated	Operation of the user interface	Button codification
2		Door interlock Washing solenoid	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through washing compartment	(**)Selection position code
3		Door interlock Pre-wash solenoid	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through pre-wash compartment (bleach)	(**)Selection position code
4		Door interlock Pre-wash and wash solenoids	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through conditioner compartment	(**)Selection position code
5		Door interlock. Bleach/stains solenoid.	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through bleach/stains compartment	(**)Selection position code
6		Door interlock Washing solenoid if the level of water in the tub is below 1st level Heating element.	Door locked. Water at 1st level. Maximum time 10 min. or up to 90ºC. **(*)**	Heating	(**)Selection position code
7		Door interlock. (Washing solenoid if the level of water in the tub is below 1st level). Motor (55 rpm clockwise, 55 rpm counter-clockwise, 250 rpm impulse)	Door locked Water level at 1st level.	Check for leaks from the tub	(**)Selection position code
8		Door interlock Drain pump Motor up to 650 rpm then at maximum spin speed	Door locked Water level lower than anti-boiling level for spinning	Drain and spin; control of congruence in closure of level pressure switches	(**)Selection position code
9	---	---	---	---	---
10		Reading/cancelling last alarm	---	---	Alarm code
11, 12 ...24		All LEDs light in sequence. Pressing a button the corresponding LED lights (and the Buzzer sounds, if featured)			

(*) In most cases, this time is sufficient to check the heating. However, the time can be increased by repeating the phase without draining the water: for a moment to a different phase of the diagnostics cycle and then back to the heating control phase (if the temperature is higher than 80°C, heating does not take place).

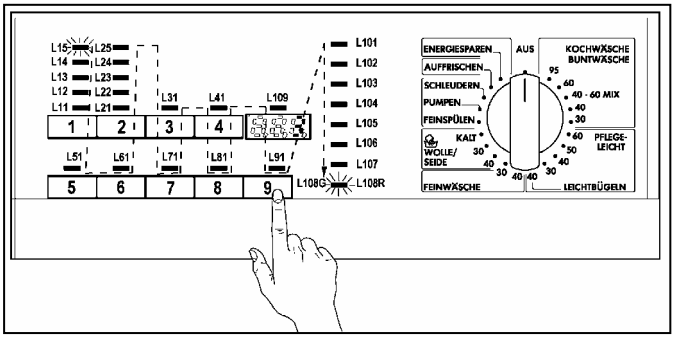
(**) See table page 39, “Display code”.

(1) Models with Display.

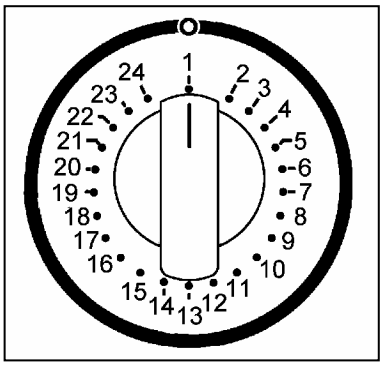
9.3.1 Display board diagnostics

After entering the diagnostics system, the display board is checked: all LEDs and the display light in sequence (if featured).

Pressing all buttons, the corresponding LEDs switch on or those closer; the display shows the hexadecimal code corresponding to the button codification.



9.3.2 Programme selector



In the table are indicated the closures between the contact C6 (common) and the other contacts (C1–C5) of the programme selector in the different positions and the corresponding codification. The code is displayed only in the appliances with display.

Selector position	Closure of selector contacts (C6 is the common)					Display code
Type 24 positions	C1	C2	C3	C4	C5	
1 - Cancel	0	1	1	1	1	**1 E**
2	0	1	0	0	1	**0 6**
3	0	1	1	0	0	**1 4**
4	0	1	0	1	0	**0 C**
5	0	1	1	1	0	**1 C**
6	0	0	0	1	1	**0 A**
7	1	0	0	0	0	**0 1**
8	1	0	0	0	1	**0 3**
9	1	0	0	1	0	**0 9**
10	0	1	0	1	1	**0 E**
11	0	0	1	0	1	**1 2**
12	1	0	0	1	1	**0 b**
13	1	0	1	0	0	**1 1**
14	0	0	1	1	0	**1 8**
15	1	0	1	0	1	**1 3**
16	0	0	1	1	1	**1 A**
17	1	0	1	1	0	**1 9**
18	1	0	1	1	1	**1 b**
19	1	1	0	0	0	**0 5**
20	0	1	1	0	1	**1 6**
21	0	0	0	0	1	**0 2**
22	0	1	0	0	0	**0 4**
23	0	0	0	1	0	**0 8**
24	0	0	1	0	0	**1 0**

10 ALARMS

10.1 Displaying the alarms to the user

Control of the alarm system can be configured; according to the model, therefore, some or all of the alarms may be displayed to the user.
Normally all the alarms are displayed to the user except for:

- E10 – water fill
- E20 – drain water
- E40 – door closure
- E90 – configuration

The alarms are active during the execution of the washing programme; except for the alarms relative to the configuration and power/frequency supply which are displayed also in the selection phase.
The door can normally be opened (except where specified) when an alarm condition has occurred on condition that:

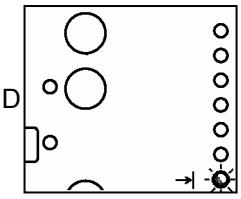
- The level of the water in the tub is below 1st level
- The temperature of the water is lower than 55°C

Certain alarm conditions require that a drain phase be performed before the door can be opened:

- Cooling water fill if the temperature is in excess of 65°C
- Drain until closure of both pressure switch contacts (1st level and anti-boiling safety system) on EMPTY within a maximum of 3 minutes.

10.1.1 Alarms displayed during normal operation

The type of alarm condition is displayed to the user by the repeated flashing of the END OF CYCLE LED (0.4 seconds lit, 0.4 seconds off, with an interval of 2.5 seconds between sequences). This LED is featured on ALL MODELS, though configured in different positions.



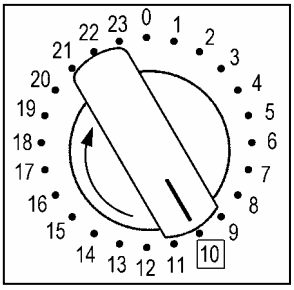
If, for example, the user should forget to close the door, the control system will detect alarm E41 about 15 seconds after the start of the cycle; the cycle remains in PAUSE mode and the display, if featured, would display E40.

Simultaneously the LED end-of-cycle flashes repeating the sequence indicated in the table.
The four flashing indicate the first of the two digits of the alarm E**4**1 (the alarms relative to a same function are grouped by families).

In this case, once the door has been closed, it is sufficient to press the start button to start the programme.

LED end of cycle →|		
On/Off	**Time (Sec.)**	**Value**
☀	0.4	1
○	0.4	
☀	0.4	2
○	0.4	
☀	0.4	3
○	0.4	
☀	0.4	**4**
○	0.4	
○	2.5	Pause between sequences

10.2 Reading the alarm codes

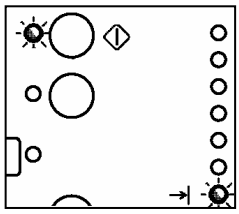


In order to read the last alarm code memorized in the EEPROM on the PCB:

- Enter diagnostics mode
- Irrespective of the type of PCB and configuration, turn the programme selector **clockwise** to the **tenth position**.

10.2.1 Displaying the alarm

The alarm is displayed by a repeated flashing sequence of the two LEDs (0.4 seconds lit, 0.4 seconds off, with an interval of 2.5 seconds between sequences). *The buzzer (if featured) will sound "bips" in synchronization with the flashing of the LEDs*.



- **END OF CYCLE** LED → indicates the first digit of the alarm code (family)
- **START/PAUSE** → indicates the second digit of the alarm code (number within the family)

These two LEDs are featured on all models (though they are **configured differently**), and flash simultaneously.

Notes:

- The first letter of the alarm code "**E**" (Error) is not displayed, since this letter is common to all alarm codes.
- The alarm code "families" are shown in hexadecimal; in other words:

→ **A** is represented by 10 flashes
→ **B** is represented by 11 flashes
→ ...
→ **F** is represented by 15 flashes

- Configuration errors are shown by the flashing of a series of LEDs.

10.2.2 Examples of alarm displays

Example: Alarm E43 will display the following:

- On the display, if featured, **E43**
- The sequence of **four** flashes of the **End-of-cycle LED** indicates the first number E**4**3;
- The sequence of **three** flashes of the **Start/Pause** LED indicates the second number E4**3**;

END-OF-CYCLE LED →|			**START/PAUSE LED** ◇		
On/Off	**Time (Sec.)**	**Value**	**On/Off**	**Time (Sec.)**	**Value**
☀	0.4	1	☀	0.4	1
○	0.4		○	0.4	
☀	0.4	2	☀	0.4	2
○	0.4		○	0.4	
☀	0.4	3	☀	0.4	**3**
○	0.4		○	0.4	
☀	0.4	**4**	○	3,3	Pause
○	0.4				
○	2.5	Pause			

10.2.3 Operation of alarms during diagnostics

All alarms are enabled during the components diagnostics phase. Moving the selector to pass from one control phase to the other, the appliance exits the alarm condition and performs the selected phase (if the alarm does not occur again).

10.3 Notes about some alarms

- **Configuration alarms**

- **E91**: the error is indicated by the flashing of all the LEDs, E90 is displayed on the display, if featured
- **E92**: the error is indicated by the flashing of the LEDs placed over the buttons, E90 is displayed on the display, if featured
- **E93**: the error is indicated by the flashing of the phase/warning LEDs, E90 is displayed on the display, if featured

- **EB1-EB2-EB3 alarms:** in case of problems with the power supply, the machine remains in alarm condition till the frequency or the power supply voltage returns to correct values or the appliance is switched off. "**EB0**" alarm family is displayed and it is not possible to enter the diagnostics or to use "alarm fast display" mode: the alarm complete can be read only when the abnormal situation terminated.

- **E51- E52 alarms:** during the diagnostics test all alarms are displayed: normally, moving the selector to pass from one control phase to the other, the appliance exits the alarm condition and performs the selected phase. This does not happen for the E51 alarms (motor power triac short-circuited) and E52 (no signal of motor tachometric generator): the only possibility to exit from the alarm condition is to switch the appliance off.

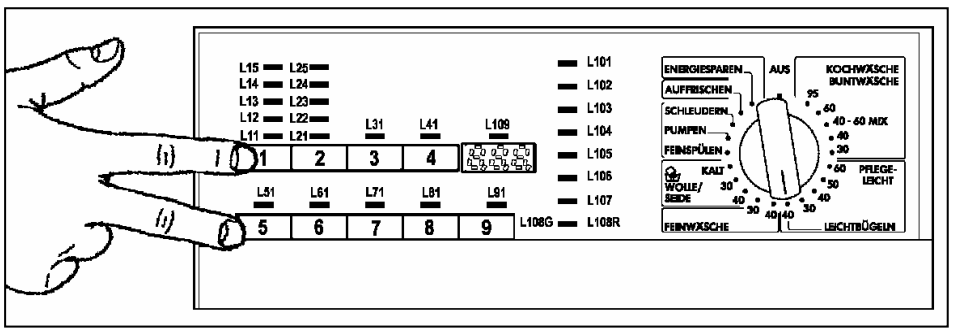
10.4 Rapid reading of alarm codes

The last alarm code can be displayed even if the programme selector is not in the tenth position (diagnostics) or if the appliance is in normal operating mode (e.g. during the execution of the washing programme):

- Press buttons **1** and **5** simultaneously for at least 2 seconds: the LED switch off and then display the sequence of flashes indicating the alarm.
- The alarm sequence is displayed for the time in which the buttons are hold down
- The reading system is the same as that indicated in paragraph. 10.2
- During the time the alarm is displayed, the appliance continues to perform the cycle or, if it is in the selection phase, it keeps in memory the options previously chosen.

10.5 Cancelling the last alarm

It is good practice to cancel the last alarm, after reading the alarm code to check whether the alarm re-occurs during the diagnostics control after the reparation of the appliance.



1. Select diagnostics mode and turn the programme selector to the **tenth** position (reading of alarm)
2. Press buttons **1** and **5** simultaneously.
3. Hold buttons **1** and **5** down (about 2 seconds).

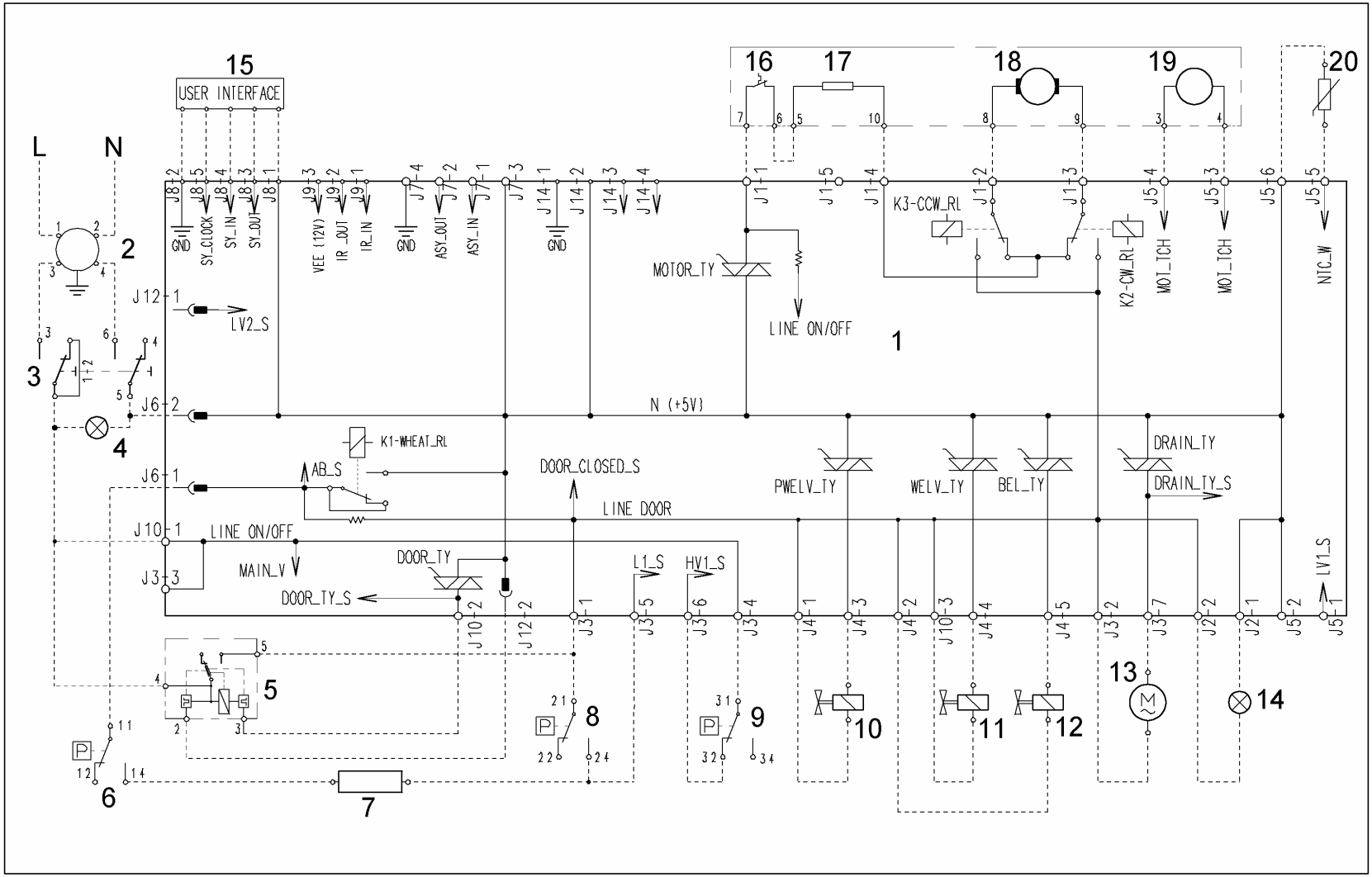
10.6 Table of alarm codes

Alarm	Description	Possible fault	Action/machine status	Reset
E11	**Difficulties in water fill for washing**	Tap closed or mains pressure insufficient; drain hose incorrectly positioned; water fill solenoid faulty; leaks from the hydraulic circuit of the pressure switch; pressure switch faulty; wiring faulty; PCB faulty.	Cycle paused with door closed	Start
E13	**Water leakage**	Drain hose incorrectly positioned; mains pressure insufficient; water fill solenoid faulty; leakage/blockage of pressure switch hydraulic circuit; pressure switch faulty.	Cycle paused with door closed	Start
E21	**Difficulties in draining**	Drain hose kinked/blocked/incorrectly positioned; drain filter blocked/dirty; drain pump faulty; wiring faulty; PCB faulty; current leakage from heating element to ground.	Cycle paused	Start
E23	**Drain pump triac faulty**	Drain pump faulty; wiring faulty; PCB faulty.	Safety drain cycle – Cycle stopped with door open	OFF
E24	**Fault in "sensing" circuit of drain pump triac**	PCB faulty.	Safety drain cycle – Cycle stopped with door released	OFF
E33	**Incongruence between closure of anti-boiling and 1st level pressure switch contacts**	Pressure switch faulty; current leakage from heating element to ground; heating element; wiring faulty; PCB faulty.	Safety drain cycle – Cycle stopped with door open	OFF/reset
E35	**Water overflow (flooding)**	Water fill solenoid faulty; leakage from pressure switch hydraulic circuit; pressure switch faulty; wiring faulty; PCB faulty.	Cycle blocked. Safety drain cycle. Drain pump always in operation (5 minutes on, 5 minutes off etc.)	OFF/reset
E36	**Fault in "sensing" circuit of anti-boiling pressure switch**	PCB faulty.	Cycle blocked, door locked.	OFF/reset
E37	**1st level sensing circuit faulty**	PCB faulty.	Cycle blocked, door locked.	OFF/reset
E39	**"HV" sensor of anti-overflow level faulty**	PCB faulty.	Cycle blocked, door locked.	OFF/reset
E41	**Door open**	Door interlock faulty; wiring faulty; PCB faulty.	Cycle paused	Start
E42	**Problems of door closure**	Door interlock faulty; wiring faulty; PCB faulty.	Cycle paused	Start
E43	**Interlock power supply triac faulty**	Door interlock faulty; wiring faulty; PCB faulty.	(Safety drain cycle) Cycle blocked	OFF
E44	**Door interlock sensor faulty**	PCB faulty.	(Safety drain cycle) Cycle blocked	OFF
E45	**Door interlock sensing circuit triac faulty**	PCB faulty	(Safety drain cycle) Cycle blocked	OFF
E51	**Motor power supply triac short-circuited**	PCB faulty; current leakage from motor or from wiring.	Cycle blocked, door locked (after 5 attempts)	OFF/reset
E52	**No signal from motor tachometric generator**	Motor faulty; wiring faulty; PCB faulty	Cycle blocked, door locked (after 5 attempts)	OFF/reset
E53	**Motor triac sensing circuit faulty**	PCB faulty.	Cycle blocked, door locked	OFF
E54	**Motor relay contacts sticking**	PCB faulty; current leakage from motor or from wiring	Cycle blocked, door locked (after 5 attempts)	OFF
E61	**Insufficient heating during washing**	NTC sensor faulty; heating element faulty; wiring faulty; PCB faulty.	The heating phase is skipped	---

Alarm	Description	Possible fault	Action/machine status	Reset
E62	**Overheating during washing**	NTC sensor faulty; heating element faulty; wiring faulty; PCB faulty.	Safety drain cycle – Cycle stopped with door open	OFF
E66	**Heating element power relay faulty**	PCB faulty; current leakage from heating element to ground.	Safety drain cycle – Cycle stopped with door open	OFF
E71	**Washing NTC sensor faulty**	NTC sensor faulty; wiring faulty; PCB faulty.	The heating phase is skipped	Start
E74	**Washing NTC-sensor badly positioned**	NTC sensor badly positioned; NTC sensor faulty; wiring faulty; PCB faulty.	The heating phase is skipped	Start
E82	**Error in selector reset position**	PCB faulty (Wrong configuration data). Selector, wiring	---	OFF/reset
E83	**Error in reading selector**	PCB faulty (Wrong configuration data). Selector, wiring	Cycle cancelled	---
E91	**Communication incongruence between main PCB- display board (versions not compatible)**	Wiring faulty; Faulty control/display board Main PCB faulty.	Cycle interrupted	---
E92	**Communication incongruence between main PCB- display board (versions not compatible)**	Wrong control/display board; Wrong PCB (do not correspond to the model).	Cycle interrupted	---
E93	**Incorrect configuration of appliance**	Incorrect configuration data; PCB faulty.	Cycle interrupted	OFF/reset
E94	**Incorrect configuration of washing cycle**	Incorrect configuration data; PCB faulty.	Cycle interrupted	OFF/reset
E95	**Communication error between microprocessor and EEPROM**	PCB faulty.	Cycle interrupted	OFF/reset
E97	**Incongruence between programme selector and cycle configuration**	Faulty PCB (Wrong configuration data).	Cycle interrupted	OFF/reset
EB1	**Frequency of appliance incorrect**	Power supply problems (incorrect / disturbance); PCB faulty.	Cycle interrupted	---
EB2	**Voltage too high**	Power supply problems (incorrect / disturbance); PCB faulty.	Cycle interrupted	---
EB3	**Voltage too low**	Power supply problems (incorrect / disturbance); PCB faulty.	Cycle interrupted	---
EF1	**Drain filter blocked (too long drain phase)**	Drain tube blocked/kinked/too high; Drain filter dirty/blocked.	Warning displayed at the end of cycle (specific LED)	---
EF2	**Overdosing of detergent (too much foam during drain phases)**	Excessive detergent dosing; drain tube kinked/blocked; Drain filter dirty/blocked.	(specific LED)	---
EF3	**Control water intervention**	Water leakage on the base; faulty water control device.	Water drain and cycle blocked	OFF/reset
E00	**No alarm**	---	---	---

11 BASIC CIRCUIT DIAGRAM

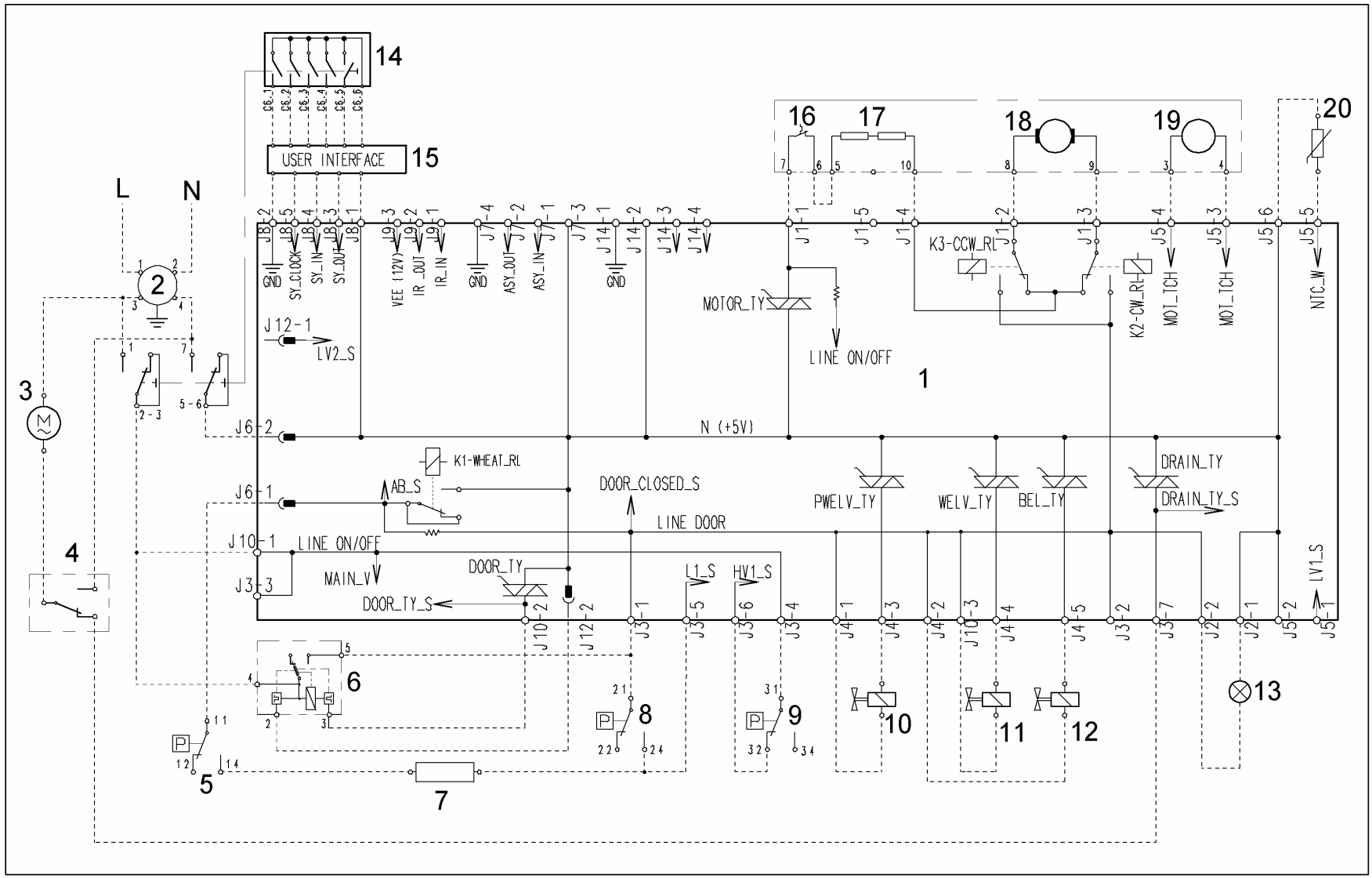
11.1 Diagram (without Water Control)



11.1.1 Key to circuit diagram

Components in the appliance	Components of the PCB	
1. Electronic board		
2. Suppressor	BELV_TY	Bleach solenoid Triac
3. ON/OFF switch	DOOR_TY	Door interlock Triac
4. ON/OFF pilot lamp	DRAIN_TY	Drain pump Triac
5. Door interlock	K1	Heating element relay
6. Anti-boiling pressure switch	K2	Motor relay: clockwise rotation
7. Heating element	K3	Motor relay: anti-clockwise rotation
8. 1st level pressure switch	K4	Motor relay: half field power supply *(models with higher spin at 1200 rpm)*
9. Anti-overflow pressure switch (*not all models)*	MOTOR_TY	Motor Triac
10. Pre-wash solenoid valve	PWELW_TY	Pre-wash solenoid Triac
11. Wash solenoid valve	Serial interface	Asynchronous serial interface
12. Bleach solenoid valve *(not all models)*	WELV_TY	Wash solenoid Triac
13. Drain pump		
14. Closed door lamp *(not all models)*		
15. Control/display board		
16. Thermal cut-out (motor)		
17. Stator (motor)		
18. Rotor (motor)		
19. Tachometric generator (motor)		
20. NTC temperature sensor		

11.2 Diagram (with Water Control)



11.2.1 Key to circuit diagram

Components in the appliance	Components of the PCB	
1. Electronic board		
2. Suppressor	BELV_TY	Bleach solenoid Triac
3. Drain pump	DOOR_TY	Door interlock Triac
4. Water control	DRAIN_TY	Drain pump Triac
5. Anti-boiling pressure switch	K1	Heating element relay
6. Door interlock	K2	Motor relay: clockwise rotation
7. Heating element	K3	Motor relay: anti-clockwise rotation
8. 1st level pressure switch	K4	Motor relay: half field power supply *(models with higher spin at 1200 rpm)*
9. Anti-overflow pressure switch (*not all models)*	MOTOR_TY	Motor Triac
10. Pre-wash solenoid valve	PWELW_TY	Pre-wash solenoid Triac
11. Wash solenoid valve	Serial interface	Asynchronous serial interface
12. Bleach solenoid valve *(not all models)*	WELV_TY	Wash solenoid Triac
13. Closed door lamp *(not all models)*		
14. Selector		
15. Control/display board		
16. Thermal cut-out (motor)		
17. Stator (motor)		
18. Rotor (motor)		
19. Tachometric generator (motor)		
20. NTC temperature sensor		